Operating Instructions

Lathes

With prismatic cast iron bed

D4000

WABECO

MASCHINENMANUFAKTUR seit 1885

Please read before putting into operation for the first time!

Every person that operates the machine, maintains or repairs it, must have read the operating instructions, and in particular, the safety notes prior to putting the machine into operation. Please store these documents for subsequent use

Original version in German/translation in English
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Dear Customer!

With the purchase of the **WABECO machine** you have decided in favour of a quality tool. This machine has been manufactured with the greatest of care and subject to precise quality controls.

These operating instructions are designed to help you to use your new machine safely and correctly. For this reason, we ask you to read the appropriate notes through attentively and to take care to observe them.

After unpacking the tool, check whether any transportation damages have occurred. Complaints, whatever their nature, should be communicated immediately. Subsequent claims **cannot** be recognized.

For all queries and replacement part orders, please **always specify the machine number** (see type plate).

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Disposing of the machine

The transportation and protective packaging is made of the following materials:

- Corrugated card
- Polystyrene without Freon
- Polyethylene foil
- Timber as single-use pallet (untreated)
- Euro pallet (multiple use packaging)

If you no longer need the items, or you do not want to reuse them, dispose of these items at the officially recognized recycling points.

The machine is manufactured in such a way that 98% of the used materials that can be recycled, for example, steel, cast iron, aluminium and only 2% are chemical materials, e.g. cable sleeves of electrical cables, PCBs.
If you have any difficulties in disposing of these parts properly, we would be happy to help: with prior agreement we will take back the machine in full and dispose of it. You must, however, cover the costs of sending it to us.

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Declaration of conformity

We hereby declare, in the name of the manufacturer

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that the following named

Universal lathe

Type:

D4000

in the serial version, meets the following relevant regulations

- **EU Machine Directive 2006/42/EC**
- **EMC Directive 2004/108/EC**
- **EU Low Voltage Directive 2006/95/EC**

In order to fulfil/implement the requirements of the directives named above, the already published and applicable standards were drawn upon:

EN ISO 12100:2010
DIN EN 60204-1:2006
EN ISO 23125:2010

Proxy for the compilation of the technical documentation is the operational head of the above named manufacturer, Mr Christoph Schneider.

D-54673 Neuerburg 2014

Place and date of issue

Operational head Christoph Schneider

1. Important safety notes

1.1 Intended use

The lathes described in these operating instructions are designed for the processing of metal, plastic and timber only.

To ensure safe operation of the lathes, the regulations set out in the chapter: "Safety regulations" must be observed.

1.2 Improper and incorrect use

The lathes described in these operating instructions have been developed and manufactured for the purpose named above. Walter Blombach GmbH accepts no responsibility for property damage and personal injury caused as a result of not intended and incorrect use of the lathes.

1.3 Modifications to the machine

For reasons of safety, it is forbidden for the user to make modifications of any type to the lathe.

Walter Blombach GmbH accepts no responsibility for property damage and personal injury caused as a result of any modifications to the lathe by the user that have not expressly been authorized by the company.

1.4 Safety regulations for proper use

The machine may represent a source of danger if it is not used correctly. For this reason, it is important that the following safety regulations are read attentively and observed carefully.

Every person that operates the machine, maintains or repairs it, must have read the operating instructions, and in particular, the safety notes prior to putting the machine into operation.

In order to fulfil these requirements, these operating instructions must accompany the machine throughout its entire lifetime and be available for research.

In the event that the machine changes owners, the operating instructions must thus be passed on to the new owner along with the machine.

1. Important safety notes

1.4 Safety regulations for proper use

1. **Only specially trained persons may operate the machine. The guarantee and warranty are voided if damages are caused by improper operation.**
2. **We remind you that no liability will be accepted for damages caused by not observing these operating instructions.**
3. **The operator of the machine is to ensure that at least one copy of the operating instructions is stored in the immediate vicinity of the machine and available to the people who work with the machine.**
4. **The operator is to ensure that the safety and danger notifications on the machine are observed and that the signs are kept in a legible state.**
5. **Do not work without goggles.**
6. **Wear close fitting clothing and, if you have long hair, wear a hair net. Do not wear loose fitting or loose items (ties, shirt sleeves, jewellery etc.).**
7. **Gloves may not be worn.**
8. **In the event of an emission noise level as of 80 dB (A) at the workplace, ear defenders must be worn.**
9. **The machine may not operate without supervision.**
10. **Secure your machine in such a way that it cannot be switched on by children. Persons who have not been trained may not operate the machine.**
11. **Before using the machine, make sure it is in good working condition. Pay special attention to any damage to the grounded plug or the electrical connections. Never operate the machine with a defective, crushed or exposed cable.**
12. **Plug the grounded plug into a suitable socket for the machine. The cable for the machine may only be connected to a safety socket or a connection box. Have the safety socket or connection box checked by an electrical specialist before hand.**
13. **The safety socket or connection box must be close enough to the machine that the power cable is not under strain.**
14. **When carrying out maintenance and cleaning work, the machine must be switched off and the grounded plug pulled out.**
15. **Set-up work is only to be carried out with the machine switched off.**
16. **Do not reach into the operating machine.**
17. **Always switch the machine off when you are not using it.**
18. **Remain with the machine until it has come to a standstill.**

1. Important safety notes

1.4 Safety regulations for proper use

19. **Only have repairs carried out by a qualified specialist! Repair work may only be carried out by persons who are qualified for the relevant repairs and who are familiar with the appropriate health and safety requirements.**
20. **Protect the machine from damp.**
21. **Constantly check the machine for damages. Replace damaged parts only with original parts and have these replaced by a specialist. The guarantee and warranty is voided if accessories and replacement parts are use that are not designed for the machine.**
22. **To avoid insufficient lighting, we recommend setting up a light source that provides a value of at least 500 Lux at the tool's cutting edge.**
23. **Do not remove the generated shavings with your hand. Use the appropriate tools (hand-held sweeper, hook, brush).**
24. **Tools and work pieces may never be changed when the machine is running.**
25. **Do not brake work pieces and bush using your hand or another object.**
26. **Never leave the chuck key fitted (even when not in operation).**
27. **Pay attention to the spread of the lathe chuck.**
28. **The maximum revolution range specified on the lathe chuck may not be exceeded.**
29. **The machine only operates when the chuck protection hood is folded over the lathe chuck. For safety reasons, it is not possible to switch the machine on when the chuck protection hood is up.**
30. **The generated shavings must be caught by the user with the help of a shaving protection device.**
31. **Always keep the gear cover hood closed.**
32. **The gear cover hood may only be opened by a trained person with a special key and when the grounded plug has been pulled out of the socket.**
33. **Turning steels must be firmly tensioned, at the correct height and as short as possible.**
34. **Do not measure at the rotating work piece (risk of accident, measuring tools will be damaged).**
35. **When working between the tips, check the locking lever of the tailstock for firm seating.**
36. **Despite the existing safety clutch, you should avoid reaching into the rotating hand wheel when the automatic feed is switched on.**
37. **When working with the automatic feed, always pay attention to ensure that the tool skid does not come up against the lathe chuck or the tailstock.**
38. **When wood turning use a lathe centre point instead of the lathe chuck to carry the work piece.**

1. Important safety notes

1.5 Safety features

In order to enable you to work safely with our machines, we have incorporated the following safety mechanisms. These meet the relevant European safety requirements.

- **Chuck protection hood**
  The main spindle of the machine operates only with the chuck protection hood closed. For safety reasons, if the chuck protection hood is open, the machine cannot be switched on.
- **Gear cover hood**
  Always keep the gear cover hood closed. The gear cover hood may only be opened by a trained person with a special key and when the grounded plug has been pulled out of the socket.
- **ON/OFF switch with under-voltage trigger**
  The ON/OFF switch is fitted with an under-voltage trigger, thus, in the event of a power failure, the machine does not switch itself back on automatically. This prevents risks caused by the unexpected motion of the spindle.
- **Emergency off switch**
  The emergency off switch acts to quickly stop the machine.
- **Overload protection**

The machine is fitted with an overload protection feature. This overload protection feature switches the main drive motor off automatically when the machine is overloaded. The machine can only then be switched on after a waiting period

1.6 Explanations of the symbols

With an emission noise level as of 80 dB (A) at the workplace ear defenders must be worn

Caution:
Always pull the power plug prior to any maintenance work!
Read the operating instructions prior to initial operation or maintenance work!

Caution:
Dangerous electric voltage!

2. Delivery and set up

The machine is packed with care at the factory.

The following should be checked after delivery:

1. Whether the packaging shows damages to be reported or
2. Whether the machine shows transportation damages to be reported If this is the case, we ask you to communicate this information immediately. Subsequent claims cannot be recognized.

The machine must be set up on a suitable, even and firm surface.
Suitable surfaces are, for example:

- A tool cabinet (available optionally)
- A separate workbench with a level surface (spirit level) that is strong enough to carry the weight of the lathe without bending.
- A steel plate with a level surface (spirit level)

The machine must be screwed securely to the surface it is set up on. There are holes in the base of the machine that are designed for this purpose. **Good working results and low-vibration operation can only be ensured when the prerequisites for fixture as set out above are maintained.**

The place of set up should be selected in such a way that

- There is sufficient lighting
- The electrical power supply with safety socket and earth are installed close enough to the machine that the power cable is not subject to any strain.
- The power cable should also be dimensioned in such a way that a multiple socket can be used, for example, to power a coolant system.

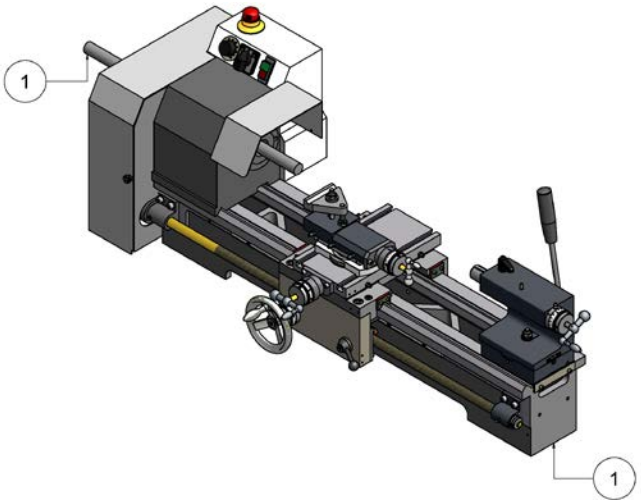
2. Delivery and set up

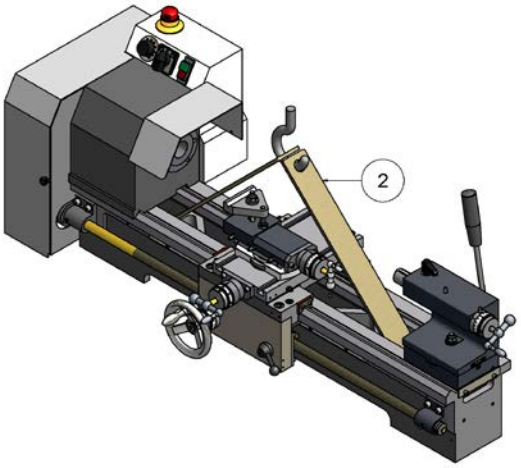
2.1 Transporting the machine

We recommend two people to lift the machine, using the positions shown (1).
To do this, a sufficiently dimensioned, at least Ø 20 mm steel rod is pushed through the main spindle. The machine should be carried and balanced by one person at the steel rod and by the other person, at the shown position on the opposite underside of the bed.

Due to the weight of the machine it is advisable to lift the machine by crane, if this is possible. To lift, wrap suitable lashing (2) as shown around the two outer struts of the ribbing of the machine bed.

When lifting, pay attention to an ergonomic stance and sufficient safety!





In the delivered state, the machine feet have two transport straps attached. These secure the machine to the transportation pallet. They must be removed before setting the machine up.

3. Putting into operation

- Use a dry cloth to remove the corrosion protection that was applied to all exposed parts for transport
- In the event of marine impregnation of exposed parts, it is recommended you spray them with oil, allow it to work, and then remove the impregnation with a dry cloth
- Once set up properly (see the section on delivery and set up) connect the grounded plug directly to a safety socket and the 230 V 50/60 Hz (optional 110 V 60 Hz) mains power supply
- Provision of sufficient coolant for the operation of a coolant system (optional)
- Release the axis clamps and check the individual feed spindles for easy operation
- Check all electronic operating elements, for example, ON/OFF switch, emergency off switch, potentiometer, bush protection hood, etc. for functionality.

4. Specifications regarding the machine

4.1 Identification of the model

The precise model designation of your machine can be found on the type plate attached to the machine.

4.2 Noise emission declaration

Noise emission declaration in accordance with DIN EN ISO 3744
Emission values in idle

Emission noise level at the workplace	
at 50 %	= 70,3 dB (A
at 100 %	= 78,2 dB (A)
Sound power level	
at 50 %	= 76,8 dB (A)
at 100 %	= 86,6 dB (A)

With an emission noise level as of 80 dB (A) at the workplace
ear defenders must be worn

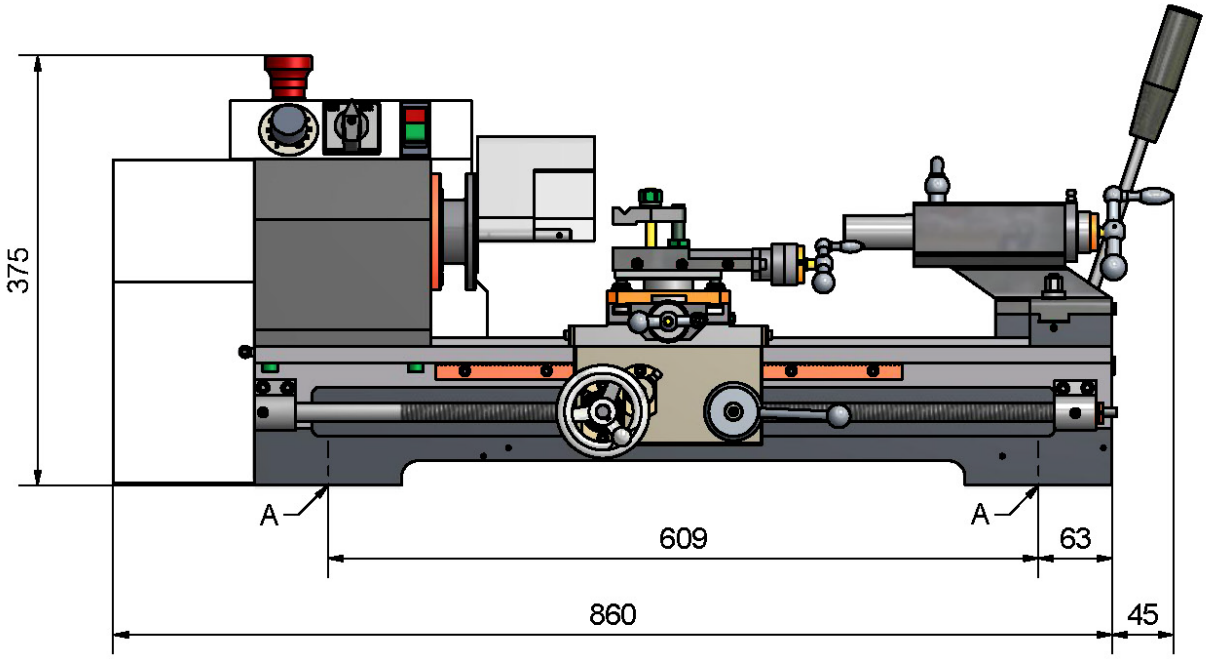
4. Specifications regarding the machine

4.2.1 Technical data

Working areas	
Distance between centers	350 mm
Centre height	100 mm
Swing diameter via guide	200 mm
Bed width	120 mm
Main drive motor	
Nominal voltage	230 V
Nominal frequency	50/60 Hz
Nominal performance of the spindle motor	1,4 kW
Spindle revolutions, infinite	30 - 2300 rpm
Machine accuracy	
Concentricity of the spindle lug	0.005 mm
Cylindrical rotation on 100 mm overhung	0.01 mm
Cylindrical rotation with simple turning on 300 mm between the centers	0,015 mm
Headstock	
Main spindle aperture	Ø 20 mm
Taper in main spindle	MK3
Main spindle lug	According to DIN 6350
Tool skid	
Adjustability of the transverse skid	120 mm
Adjustability of the longitudinal skid	50 mm
Longitudinal skid can be swivelled by	360°
Max. turning steel height	16 mm
Tailstock with quick adjustment	
Lateral adjustability of the tailstock upper	± 10 mm
Tailstock sleeve	With inner Morse taper MK2
Sleeve adjustability	45 mm
Scale ring read accuracy	0.1 mm
Thread cutting	
Tumbler gear drive	For left-right thread
2 automatic longitudinal feeds	0.085 und 0.16 mm/U
Change gear set for thread cutting	Metric 0.25 – 7.0 mm - imperial 10 - 40 G/"

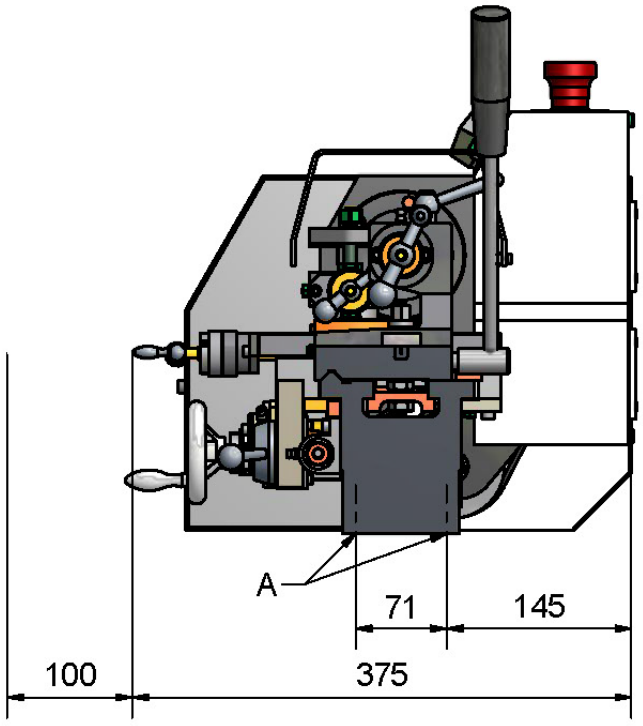
4. Specifications regarding the machine

4.4 Dimensions Front view



A 4 fixing holes M8 (20 mm deep)

4.5 Dimensions Side view



A 4 fixing holes M8 (20 mm deep)

4. Specifications regarding the machine

4.6 Revolution selection

Select the spindle revolutions according to the material type of work piece diameter:

Small work piece diameter ⇒ Relatively high revolutions
Large work piece diameter ⇒ Low revolutions

Revolutions and diameter give the cutting speed.

In the event of a specified cutting speed, the required spindle revolutions can be calculated as follows:

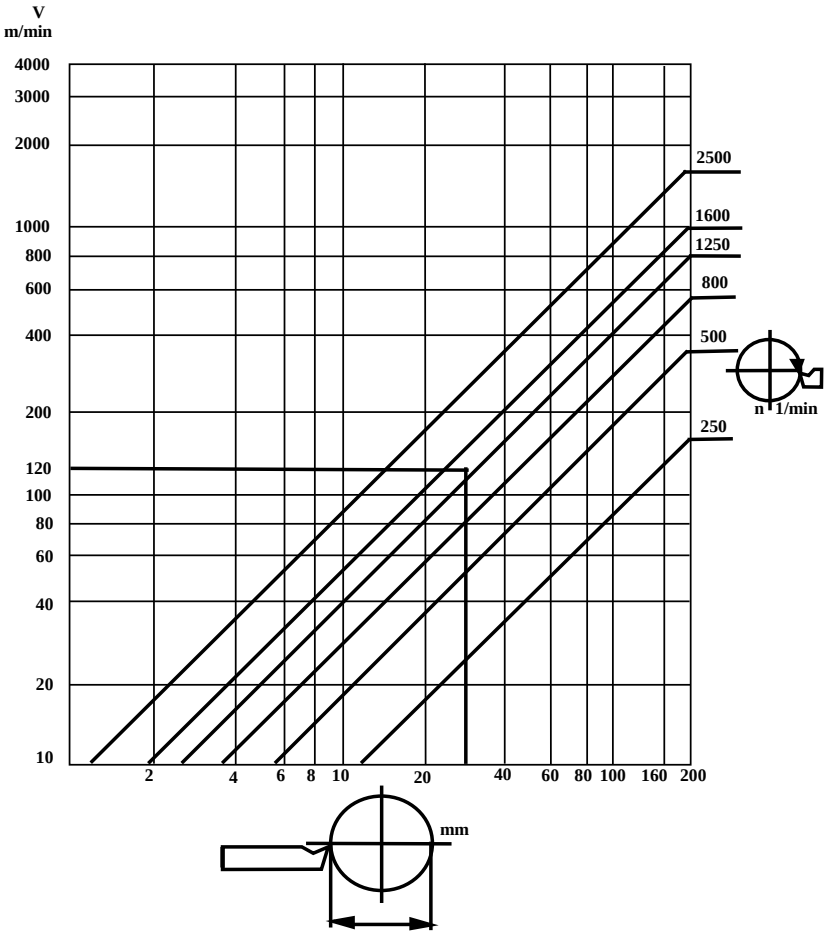
$$\text{Revolutions} \quad \frac{\text{Cutting speed (V) x 1000}}{\text{Work piece diameter (d) x 3.14}}$$

Application example:
Thus, an aluminium work piece with a Ø of 20 mm is to be turned with a cutting speed of 100 m/min.

$$\frac{100 \text{ x } 1{,}000}{20 \text{ x } 3.14} = \frac{100.000}{62.8} = 1592 \text{ rpm}$$

Now, select from the potential revolutions, the one that comes closest to the ideal of 1592 rpm.

4.7 Diagram for reading off the revolutions



4. Specifications regarding the machine

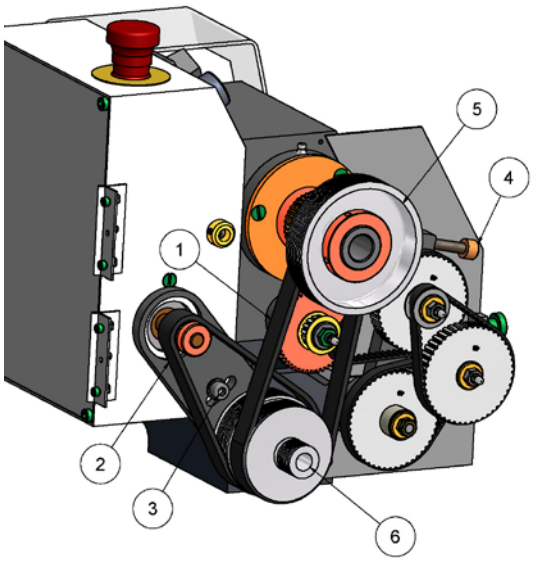
4.8 Revolution changer

The potentiometer can be used to infinitely adjust the revolutions of the working spindle from 150-2300 rpm (2nd setting = preset at the factory).

If the lower revolutions of 30-490 rpm (1st setting) are required, the drive belt must be applied. To do this, proceed as follows:

1. Open the gear cover hood by undoing the safety screw with the supplied special key
2. Undo the hexagonal nut (3) and this loosen the drive belt (1 + 2)
3. Turn the clamping screw (4) anti-clockwise in such a way that the drive belt (1) can be placed on the other transmission setting of the belt pulley (5 + 6)
4. To tension the drive belt (1 + 2) tighten the clamping screw (4) in a clockwise direction in such a way that the drive belt (1 + 2) cannot slip on the belt pulley
5. Tighten the hexagonal nut (3) back up again
6. Close the drive cover hood again and secure with the safety screw

Setting on the potentiometer	1st setting rpm	2nd setting rpm
0%	30	150
10%	35	155
20%	50	220
30%	90	450
40%	150	850
50%	200	1050
60%	290	1500
70%	350	1900
80%	400	2050
90%	460	2200
100%	490	2300



4. Specifications regarding the machine

4.9 Electrical equipment

The main drive motor (single phase series-wound motor) is supplied already installed

- The main spindle drive has an ON/OFF switch with under-voltage trigger.
- In order for the machine to start, the turn switch for forwards-reverse must be set to the required direction of rotation.
- Then switch on at the ON/OFF switch.
- The ON/OFF switch must also be switched on again after the power is interrupted.
- To change the direction of rotation of the main drive motor, the turn switch must briefly rest at the 0 position to allow the relays on the control board enough time to switch.
- In the event of the main drive motor being overloaded, it will switch itself off automatically. The main drive motor can only be switched back on again after a short waiting period.

5. Achieving optimum results and avoiding incorrect usage

- Use of suitable processing tools.
- Adaptation of revolution setting and feed to the material, work piece and tool.
- Tension tools as far into the tool holder as possible (short projecting length).
- Tension turning element as far into the chuck as possible (short projecting length).
- Support length pieces with a tailstock or bezel.
- The use of coolant and lubrication to increase the durability of the tool, improve surface quality and accuracy.
- Clamp processing tools and turning elements on a clean clamping surface.
- Lubricate machine sufficiently.
- Set the bearing clearance and guides correctly.

Longitudinal turning

- For longitudinal turning, the turning steel moves parallel to the axis of the work piece.
- To rough, it is advantageous to use straight or curved turning steels.
- To finish, use sharp or wide turning steels.

Face turning

- The processing of end planes is referred to as face turning.
- When face turning, the turning steel is moved at right angles to the rotating axis of the turning element. The tool skid should be locked when doing so.
- The main cutting edge of the turning steel is to be set precisely to the center so that the turning element center has no nose.
- The curved turning steel is used for face turning.

5. Achieving optimum results and avoiding incorrect usage

Curved lathe chisel right (2) and left (1)

- For longitudinal and face turning
- This is designed to remove as much material as possible in a short time (without paying attention to the surface created on the work piece).

Offset lateral lathe chisel (3)

- For longitudinal and face turning
- Is used for finishing (creating a clean surface).

External thread lathe chisel (4)

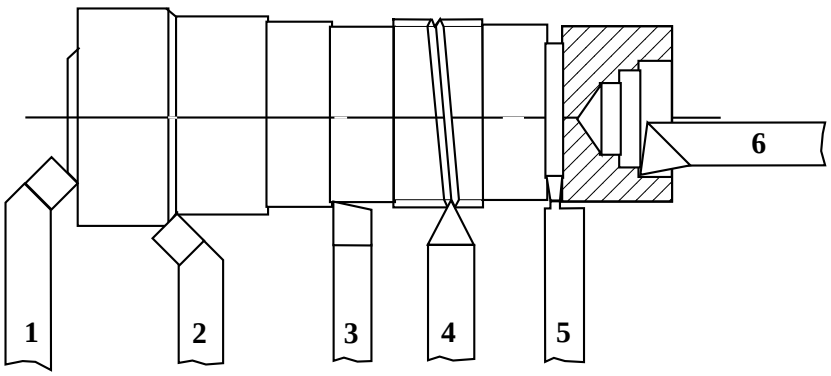
- Is used for cutting external threads

Narrow square-nose cutting tool (5)

- Is used to cut grooves and cut off work pieces
- Attention should be paid to the precise height of the center of the turning steel.
- Work with low revolutions and cool the tool (cooling via drilling oil or emulsion: acts as lubrication and removal of shavings).
- The cutting steel is to be tensioned as short as possible and at a right angle to the rotational axis.

Inner lathe chisel (6)

- Is used for hollowing out drilled holes.
- Tension as short as possible to prevent the occurrence of turning steel vibrations (untidy surface).
- As a result of the forces exerted on the turning steel, the steel must be short and secured firmly.
- If the lever arm is too long, the lathe chisel will bend and spring back.
- The cutting edge will penetrate the work piece unevenly and result in a bumpy surface.
- The turning steel is to be aligned with the center of the turning element
- The checking of the height to the center of the work piece is carried out with the help of the turning center point in the tailstock. The height position of the turning steel is achieved by adding even sheets.

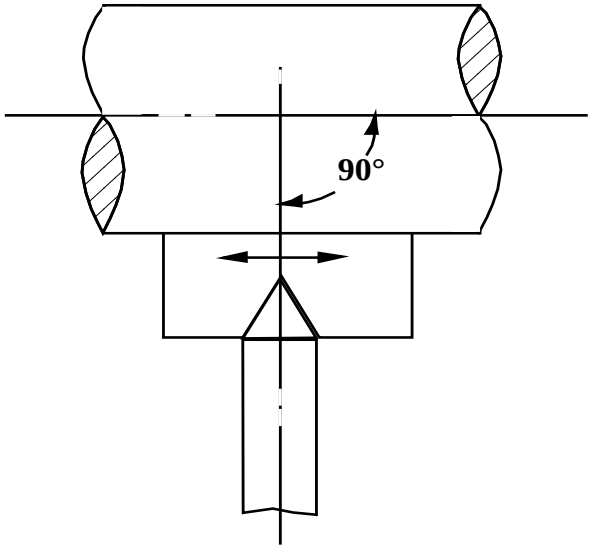


6. Thread cutting and automatic feed

6.1 Thread cutting

- The thread turning steel is a moulded turning steel with the profile of the thread to be cut.
- It is ground according to templates (Figure 1) and must be set precisely to the center of the work piece otherwise there will be a distortion in the thread profile.
- In order to obtain the correct position of thread flanks to the work piece axis, place the grinding gauge up against the work piece and use it to set the turning steel (Figure 1). To do this, push the gauge up to both flanks of the turning steel, one after another.

Figure 1: Setting the thread turning steel



- The feed of the thread turning steel is carried out via the lead screw and must match the thread gradient.
- The change gears belonging to the accessories create the connection between the feed drives and the lead screw.
- By fitting different toothed wheel combinations, it is possible to cut metric and imperial right and left threads.
- The different axis intervals of the toothed wheels can be set by swivelling the quadrant and adjusting the quadrant bolt.

Feed:

- The feed is switched on using the switch lever on the lock plate.
- The feed must always be switched on in order for the turning steel to return to the same position when carrying out multiple cutting procedures.
- After completing the cut, bring the turning steel with the transverse skid out of the inroad otherwise the flanks and cutting edges will be damaged.
- Then return the turning steel to the starting position by changing the direction of rotation of the motor via the turn switch for forwards-reverse.
- It is good if the thread end has a 4-5 mm wide clearance milled in order to better remove the thread steel out of the way.

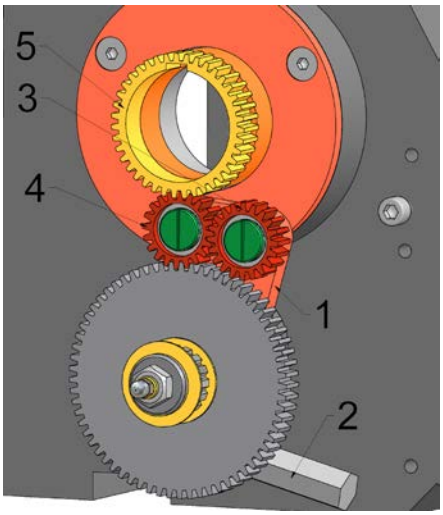
In the event of a long thread diameter, the turning center point should always be used to prevent the work piece from pushing away.

6. Thread cutting and automatic feed

6.2 Tumbler gear drive

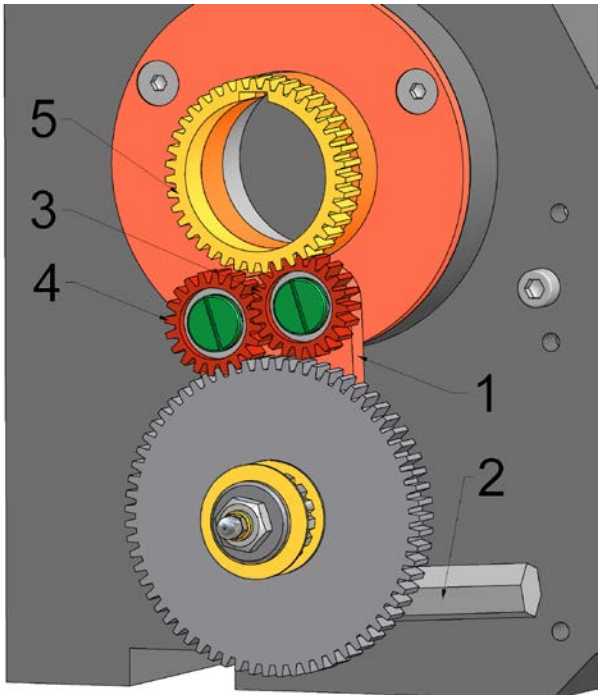
Setting for right thread and longitudinal feed (factory preset)

The toothed wheel (4) on the tumbler gear (1) is in contact with the toothed wheel (5) of the main spindle, thus, when the spindles rotate ant-clockwise (seen from the point of view of the lathe chuck), the tool skid moves towards the lathe chuck.



Setting for left thread

- Undo the clamping screw (2)
- Swivel the tumbler gear (1) to the left so that the toothed wheel (3) comes into contact with the toothed wheel (5) of the main spindle.
- With the main spindle in the same direction of rotation, the skid moves away from the lathe chuck and towards the tailstock.



6. Thread cutting and automatic feed

6.3 Use of change gears

For automatic longitudinal turning, there are two feeds available with 0.085 and 0.16 mm per revolution (the wheels are set at the factory for feed with 0.085 mm per revolution).
Fitting various toothed wheel combinations enables metric thread cutting from 0.10-7 mm and imperial threads with gradients of 10/1"-40/1"

Table for thread cutting * = Special accessories
The toothed wheels that belong to the scope of delivery are identified according to the number of teeth.
e.g. 48 stands for 48 teeth
To thread cut as of a gradient of 0.4 mm, B1 and B2 must be removed completely.

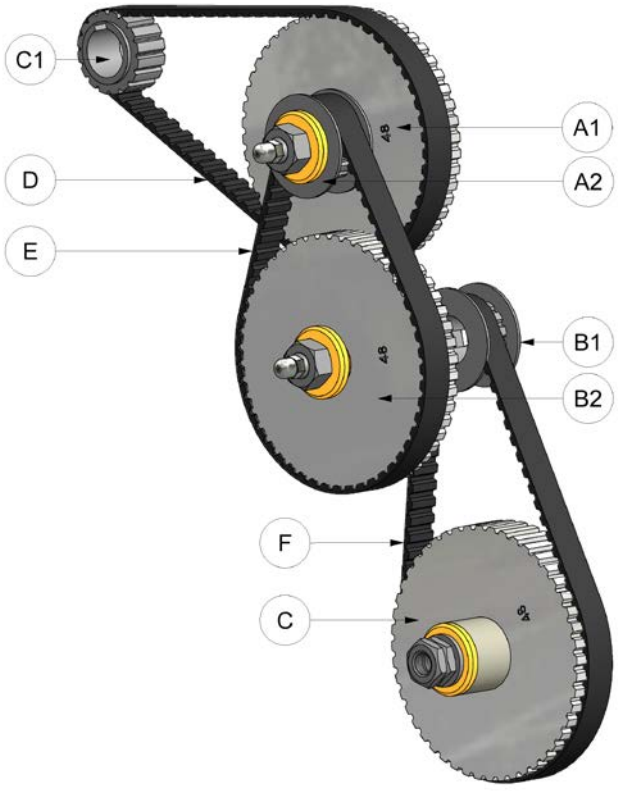


Table for automatic longitudinal feed

mm/σ	0.085	0.16
A1	48	48
A2	14	18
B1	14	20
B2	48	48
C	48	48
C1	16	16
D	140	140
E	120	120
F	120	120

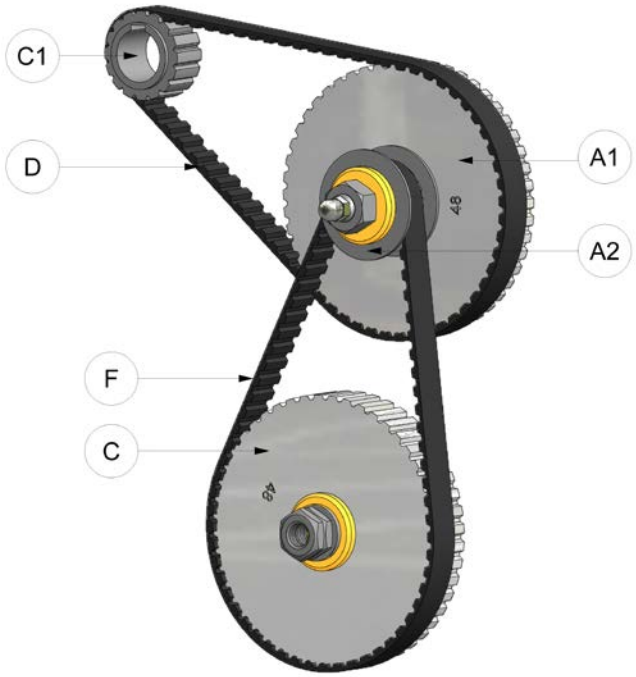
6. Thread cutting and automatic feed

6.3 Use of change gears

Table for cutting threads with a gradient of less than 0.4 mm.

To do this, B1 and B2 are required as in automatic feed.

mm	0.10	0.12	0.22	0.24	0.25
A1	48	48	48	48	48
A2	14	14	24	24	24
B1	14	18	18	18	18
B2	48	48	40	36	48
C	48	48	48	48	36
C1	20	20	14	14	16
D	140	140	140	140	140
E	120	120	120	120	130*
F	140	140	140	140	120



mm	0.4	0.5	0.7	0.75	0.8	1.0	1.25	1.5	1.75	2.0	2.5	3.0	3.5	4.0	5.0	7.0
A1	48	48	48	48	48	48	48	48	48	48	48	48	24	24	24	24
A2	16	20	14	18	16	14	20	36	28	40	40	48	28	40	40	28
C	40	40	20	24	20	14	16	24	16	20	16	16	16	20	16	16
C1	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16	32
D	120	120	120	140	140	140	140	120	140	140	120	120	120	140	120	120
F	120	120	120	120	120	120	120	120	120	140*	120	140	140	120	140	120

6. Thread cutting and automatic feed

6.3 Use of change gears

Z/1“	10	11	12	13	14	16	18	19	20	24	26	28	32	36	40
A1	34	34	34	34	34	34	34	34	34	34	34	34	34	34	34
A2	36	36	36	36	36	36	14	34*	18	24	18	18	18	14	18
C	20	22	24	26*	28	32	14	36	20	32	26*	28	32	28	40
C1	16	16	16	16	16	16	16	16	16	16	16	16	16	16	16
D	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
F	140	140	140	140	140	140	120	140	120	120	120	120	120	120	120

7. Maintenance

A long lifetime of the machine will depend on the appropriate care and maintenance.

- **All maintenance and repair tasks may only be carried out with the grounded plug pulled.**
- The machine must be cleaned after each use.
- If the machine is set up in a wet room, all exposed parts must be oiled after each use to prevent corrosion.
- Always lubricate all moving parts well.
- In the event of bearing or skid play, immediately adjust in order to prevent it from destroying the bearing or skid guide.

Approximately every 100 operating hours

- Clean the carbon brushes and collector of the drive motor (1.4 kW) with a piece of coarse sandpaper.
  Remove approximately 0.1 mm from the carbon brushes, then smooth out the contact surface with fine sandpaper.
- Check the tension of the poly V and gear belt and adjust if necessary.
- Check the play in the guides and feed spindles and set if necessary.

8. Lubrication of the machine

The lubrication process:

- Reduces wear and friction
- Increases the lifetime
- Protects metal surfaces from corrosion

We recommend:

- A class 2NLGI multi-purpose grease for lubrication
- A lubrication oil with a viscosity of 100 mm ^{2}/s for oiling

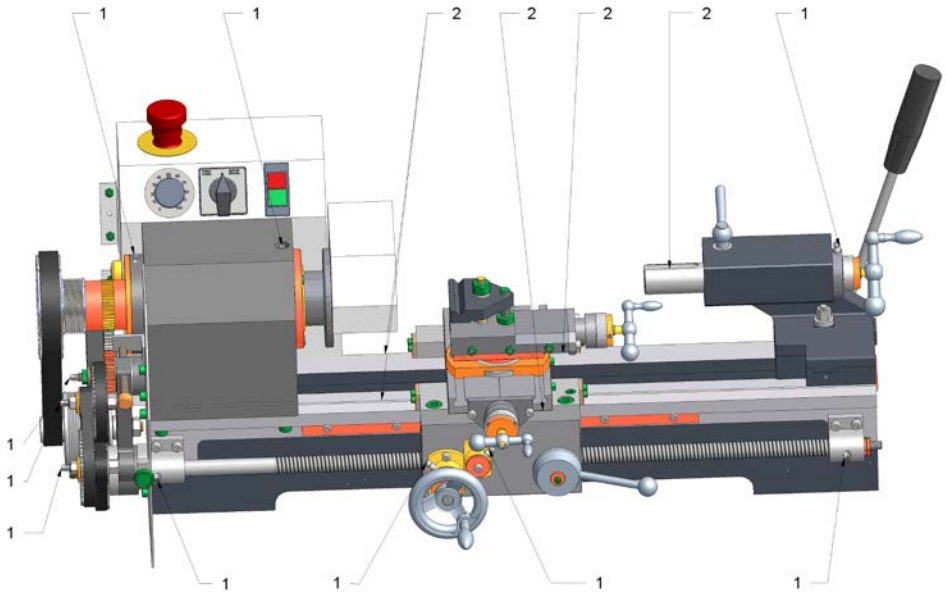
8. Lubrication of the machine

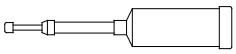
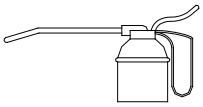
The lathe is to be lubricated every 8 hours of operation in accordance with the lubrication plan. The lubrication points

- Bed guide
- Dovetail guide-Transverse skid
- Dovetail guide-Longitudinal skid
- Tailstock sleeve

Are lubricated with the help of an oil can and an ordinary lubrication oil by moving the skid or sleeve backwards and forwards.

All other lubrication points are lubricated with a grease press at the designated lubrication nipples.



1		every 8 hours of operation
2		every 8 hours of operation

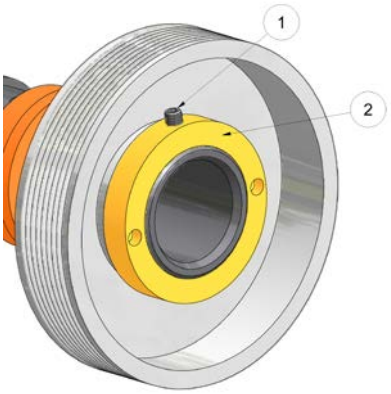
The **spindle bearing** does not need to be lubricated since the ball bearings have a closed construction form and the bearings have been supplied at the factory with sufficient grease for the lifetime of the machine.

9. Readjusting the main spindle

The headstock is screwed to the lathe bed. The headstock contains the main spindle with two adjustable precision tapered roller bearings.

If adjustment is required, proceed as follows:

1. Open the gear cover hood by undoing the safety screw with the supplied special key
2. Undo the stud screw (1) in the setting nut (2)
3. The setting nut (2) is located at the rear end of the main spindle
4. Rotate the setting nut (2) clockwise until the bearings run free again (it must be possible to rotate the main spindle by hand easily)
5. Tighten the stud screw (1) back up again
6. **If the tapered roller bearings are set too tightly they will quickly become unusable**
7. Close the gear cover hood by tightening the safety screw with the supplied special key



10. Overload coupling

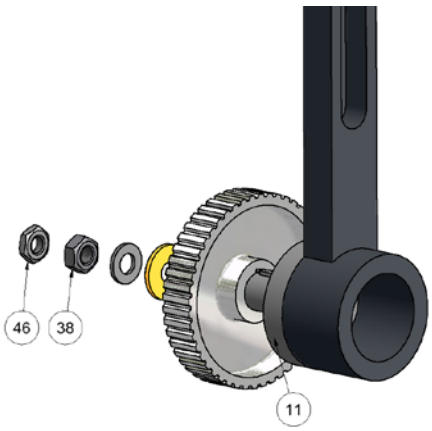
In order to prevent risks to the user and damage to the machine, an overload coupling has been fitted to the lead screw.

The overload coupling (11) is effective:

- When the feed is overloaded
- When contact is made with an end stopper in the longitudinal direction

If adjustment is required, proceed as follows:

1. The overload coupling (11) is set using the hexagonal nuts (38) and countered with the nut (46).



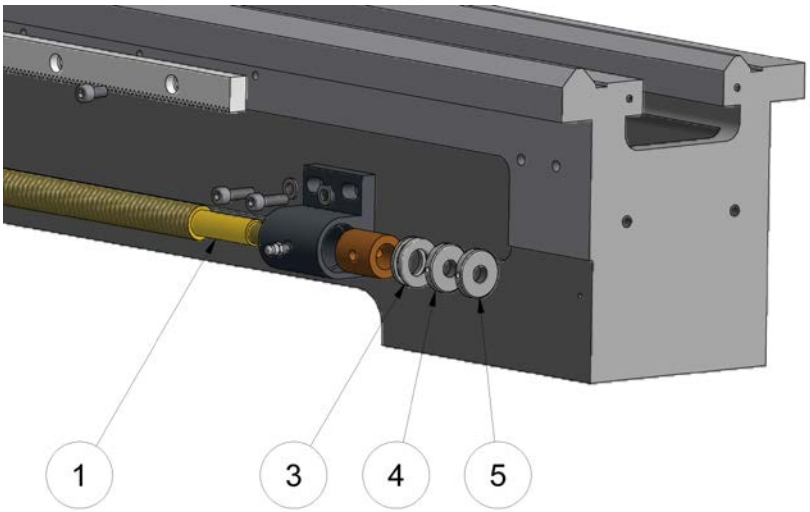
11. Readjustment of the bearing clearance of the lead screw

On the right side, the lead screw is axial mounted. This mount enables the lead screw (1) to be set without play.

If adjustment to the mount is required, please proceed as follows:

Trapezoidal-threaded spindle

1. Undo the outer of the two capstan nuts (5)
2. Turn the inner capstan nut (4) clockwise against the axial bearing (3) until the lead screw (1) has no more axial play
3. Then counter the outer capstan nut (5) against the inner capstan nut (4)



12. Tool skid – Transverse skid

The tool skid is positioned, at the front, on a prismatic guide and, at the rear, on a flat guide. The skid is held onto the bed from below with the guide bar (9) and can be set to without play using the setting bar (12).

If adjustment to the setting bar (12) is required, please proceed as follows:

1. Undo the hexagonal nuts (11)
2. Using an Allen key, tighten the threaded pins (10) in such a way that the skid is still able to move easily.
3. After setting, tighten the hexagonal nuts (11) back up again

Clamping for face turning and cutting work.

Use the Allen head screw (6) to clamp the clamping piece (8) against the underside of the prismatic guide. The tool skid can no longer be moved in the longitudinal direction

.

12. Tool skid – Transverse skid

The dovetail guide of the transverse skid can be adjusted.
If adjustment is required, please proceed as follows:

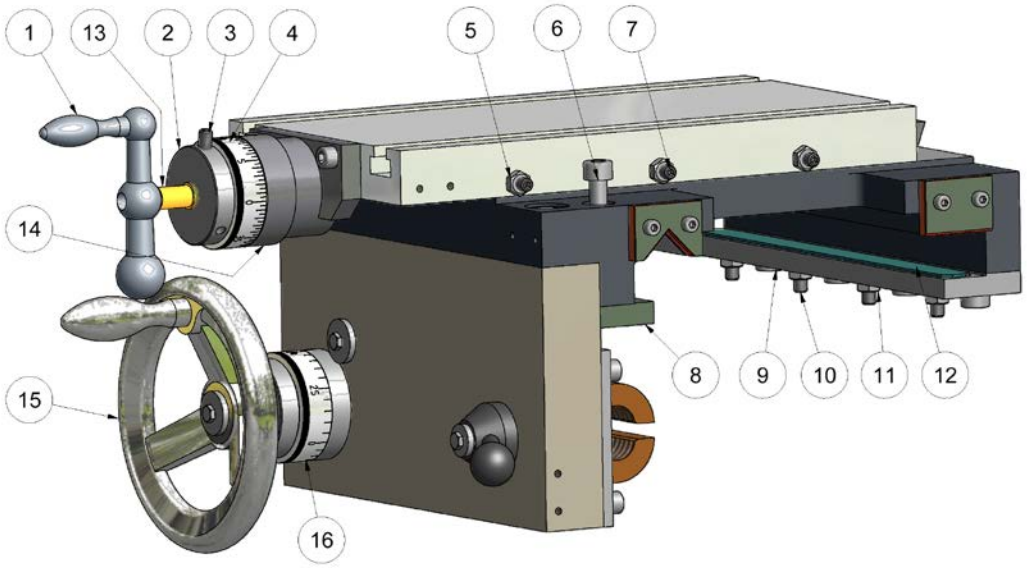
1. Undo the hexagonal nuts (5)
2. Using an Allen key, tighten the threaded pins (7) in such a way that the skid can still be moved easily using the ball crank (1).
3. After adjustment, tighten the hexagonal nuts (5) back up again

Any axial play of the spindle (13) in the spindle bearing (14) that may occur, can be adjusted.
If adjustment is required, please proceed as follows:

1. Undo the threaded pins (3)
2. Rotate the dial (2) clockwise in such a way that no axial play remains
3. Tighten the threaded pins (3) back up again
4. After adjustment, the spindle (13) should still be easy to turn

There are scale rings fitted to enable you to read of the distances

- One interval on the scale ring (4) of the transverse skid represents a 0.05 mm distance, which corresponds to the same chip removal on the work piece, thus in reality the skid is only adjusted by 0.025 mm but the work piece diameter changes by 0.05 mm.
- One turn of the ball crank (1) on the transverse skid corresponds to 1 mm of travel, but a change of 2 mm to the diameter of the work piece.
- One scale mark on the scale ring (16) of the tool skid represents a distance of 1 mm. One turn of the hand wheel (15) corresponds to a distance of 30 mm**.**



13. Tool skid – Longitudinal skid

- The longitudinal skid is secure to the transverse skid upper section with the clamping ring (3).
- After undoing the two hexagonal nuts (5) the longitudinal skid can be slid or turned on the transverse skid.
- The rotation is, for example, suitable for turning short tapers.
- In order to accurately read this setting, a scale is engraved on the guide ring (4).
- The zero mark is located on the transverse skid upper section.

The dovetail guide of the longitudinal skid can be adjusted.
If adjustment is required, please proceed as follows:

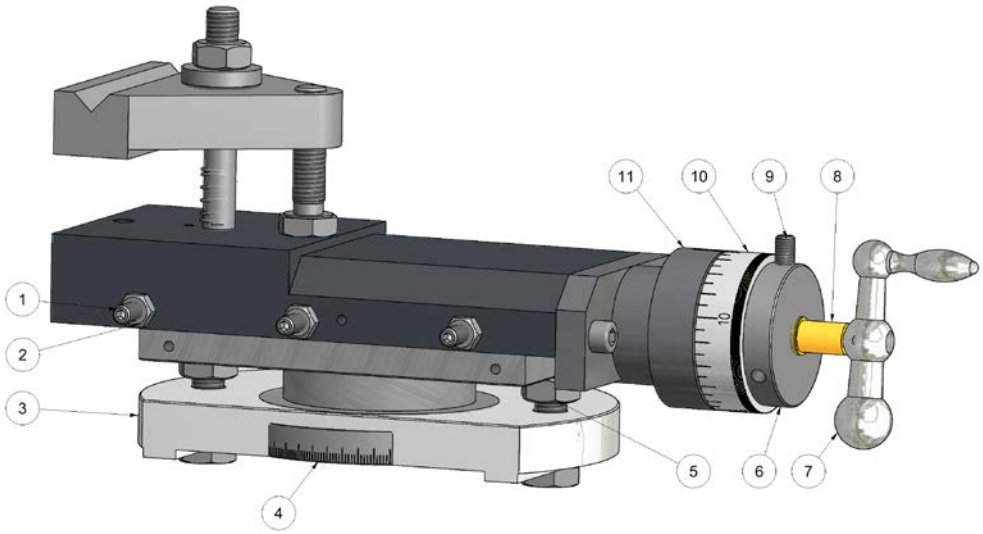
1. Undo the hexagonal nuts (2)
2. Using an Allen key, tighten the threaded pins (1) in such a way that the skid can still be moved easily using the ball crank (7)
3. After setting, tighten the hexagonal nuts (2) back up again

Any axial play of the spindle (8) in the spindle bearing (11) that may occur, can be adjusted.
If adjustment is required, please proceed as follows:

1. Undo the threaded pins (9)
2. Rotate the dial (6) clockwise in such a way that no axial play remains
3. Tighten the threaded pins (9) back up again
4. **After adjustment, the spindle (8) should still be easy to turn**

To read off the distance of travel of the longitudinal skid, there is a scale ring (10)

- One mark on the scale corresponds to an adjustment of 0.05 mm. Since the longitudinal skid does not work with diameters, this 0.05 mm corresponds to the actual distance.
- One turn of the ball crank (7) corresponds to a distance of 1 **mm.**



14. Tailstock

- The tailstock can be moved on the lathe bed.
- By moving the clamping lever (3), the tailstock can easily be secured in any position.
- The tailstock is made up of an upper and lower section.
- The upper section can be moved by a maximum of ±10 mm in order to turn long, slim tapers.

To do this, proceed as follows:

1. Undo the hexagonal nut (6)
2. With the help of both threaded pins (8), slide the upper section into the required direction

- The central position of the tailstock is shown by the scale mark (7)
- Turn a sample to see whether the work piece is cylindrical, correct the tailstock setting if necessary

Tailstock sleeve

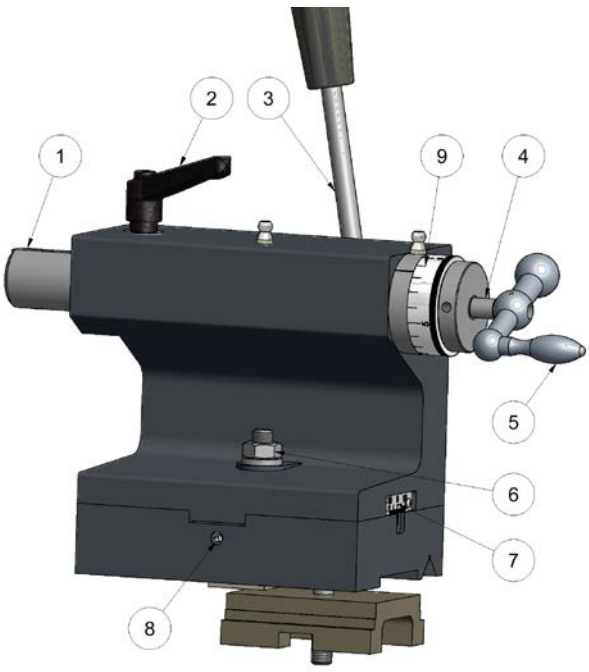
- The solid tailstock sleeve has a millimetre scale.

To read off the distance of travel of the tailstock sleeve, there is a scale ring (9)

- One mark on the scale corresponds to an adjustment of 0.05 mm.
- One turn of the ball crank (5) corresponds to a distance of 2 **mm**.
- Centre point, drill or drill chucks are **automatically ejected** when turning back.

Tool holder

- There is an **inside cone MK 2** which is designed to hold tools and is incorporated in the sleeve (1).
- Tightening the clamping lever (2) ensures that the sleeve may be easily clamped in any position.
- The sleeve is moved axially by the hand crank (5) by way of the threaded spindle (4).



15. 3 and 4 jaw lathe chuck

The 3-jaw lathe chuck

Is used to tension circular, three and six edged work piece centrally to the spindle axis.

The 4-jaw lathe chuck

Is used to tension square work pieces centrally to the spindle axis.

Risk of accidents

- **Do not attempt to clamp work pieces that are over the permitted clamping range. The clamping force is thus too low and the jaws may come undone**
- **The maximum revolution range specified on the lathe chuck may not be exceeded**

Mounting the jaws:

1. The jaws and guides are numbered from 1 - 3 or 1 – 4.
2. Open the lathe chuck with the key in such a way that the drilling jaws are released (sequence: 3, 2, 1 or 4, 3, 2, 1)
3. Insert turning jaw 1 into guide 1
4. Push turning jaw 1 in the direction of the chuck center point and, at the same time, turn the chuck key clockwise
5. When the coil has caught turning jaw 1, insert turning jaw 2 into guide 2
6. Repeat the procedure with jaws 2, 3 and 4 (for a four jaw lathe chuck)
7. Then visually check the positions of the jaws. These must meet centrally

Mounting the drilling jaws:

1. If you wish to use the drilling jaws again, the process is the repeated in the same order.
2. Three jaw lathe chuck: First jaw 1, then 2, then 3
3. Four jaw lathe chuck: First jaw 1, then 2, then 3, then 4.

16. Operational faults and the elimination of such

Operational faults	Possible cause	Remedy
Machine cannot be switched on	230V voltage is not present	Plug is not fitted correctly
		Check the fuse for the socket
	The chuck protection hood is not closed	Close the chuck protection hood
	Emergency off switch not unlocked	Unlock the emergency off switch
	Direction of rotation has not been selected	Select the direction of rotation at the turn switch
	Vibrations (e.g. by transportation) have caused the plugged contacts of the drive motor (1.4 kW) board to come undone	Pull the power plug! Remove the cover sheet of the electronic housing and check all plugged contacts.
Main spindle motor no longer starts after the unlocking of the emergency off switch	Motor controller must be unlocked	For machines with a 1.4 kW drive motor, the motor must be switched on again using the ON/OFF switch after the emergency off switch is unlocked. After unlocking, wait approximately 5 seconds before switching the machine on.
The drive motor (1.4 kW) experiences "skips" during operation	Carbon brushes and collector of the drive motor are contaminated	Clean the carbon brushes and collector of the drive motor with a piece of coarse sandpaper (See "Maintenance" section)
	Carbon brushes are worn	Replace carbon brushes with new ones
Tool skid cannot be moved or can only be moved with considerable force	Clamping of the tool skid is on	Open the clamping
	Guide play is set too narrowly	Adapt the guide play

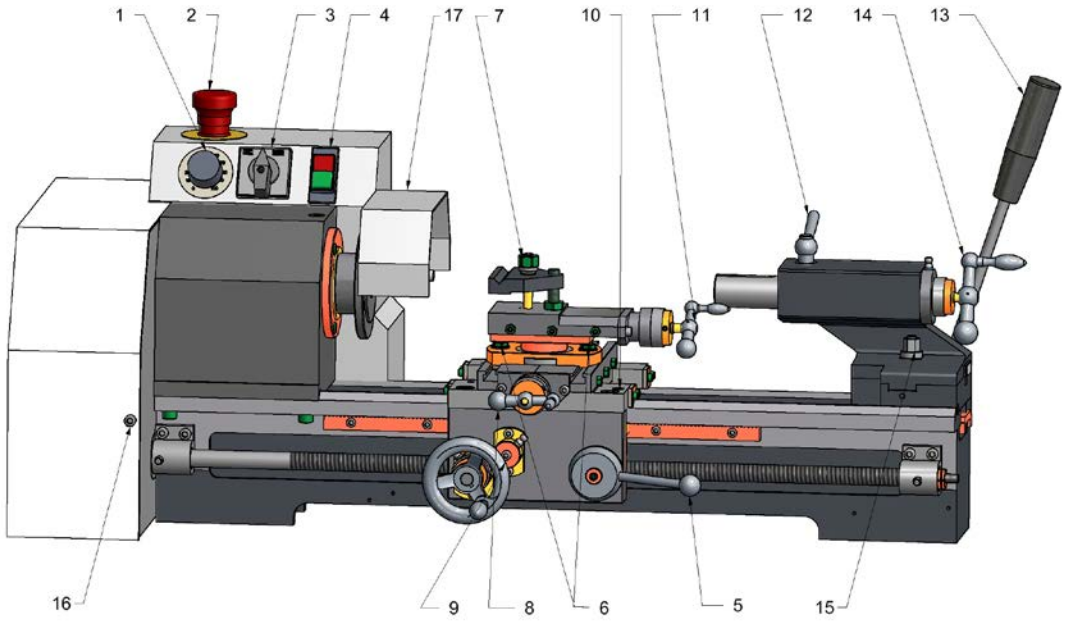
16. Operational faults and the elimination of such

Operational faults	Possible cause	Remedy
Transverse or longitudinal skid cannot be moved or can only be moved with considerable force	Guide play is set too narrowly	Adapt the guide play
	Play of the trapezoidal-threaded nut is set too narrowly (only transverse skid)	Adapt the play of the trapezoidal-threaded nut
Rust on work pieces of machine parts when using coolant lubrication	Wrong coolant set	Check the mixing ratio of the coolant and correct if required (never cool with water alone!)
Tool holder cannot be inserted into the main spindle (reducing sleeve of the main spindle)	An incorrect tool taper of the tool holder has been used in combination with the reducing sleeve	Only use the appropriate tool holders for the machine
	Inner cone of the reducing sleeve or outer cone of the tool holder is contaminated	Clean the relevant cone
Tool overheated	Revolutions too high	Reduce the revolutions
	Feed too high	Reduce the feed
	Working without coolant	Use coolant
	Insufficient coolant feed at the cutting edge	Align the coolant hose correctly
	Tool blunt	Sharpen tool or use a new tool
	Increased friction caused by shaving build up in the tensioning groove of the tool (drilling work)	Remove the shavings from the hole more frequently (withdraw)
		Use a coated tool
		Wash the processing area with coolant
	Unsuitable tool chosen for the material to be processed	Only use the suitable tool for the relevant material

16. Operational faults and the elimination of such

Tool cannot be removed from the tailstock sleeve	Tailstock sleeve is not fully cranked back	Fully crank back the tailstock sleeve to automatically eject tools with ejector lugs
	Use tool without ejector lugs	Place a soft and sufficient wide inlay between the tool and tailstock front. Now crank the tailstock sleeve back to push the tool out. (Use of tools without ejector lugs is possible by screwing a suitable threaded pin into place which extends the length of the tool backwards)

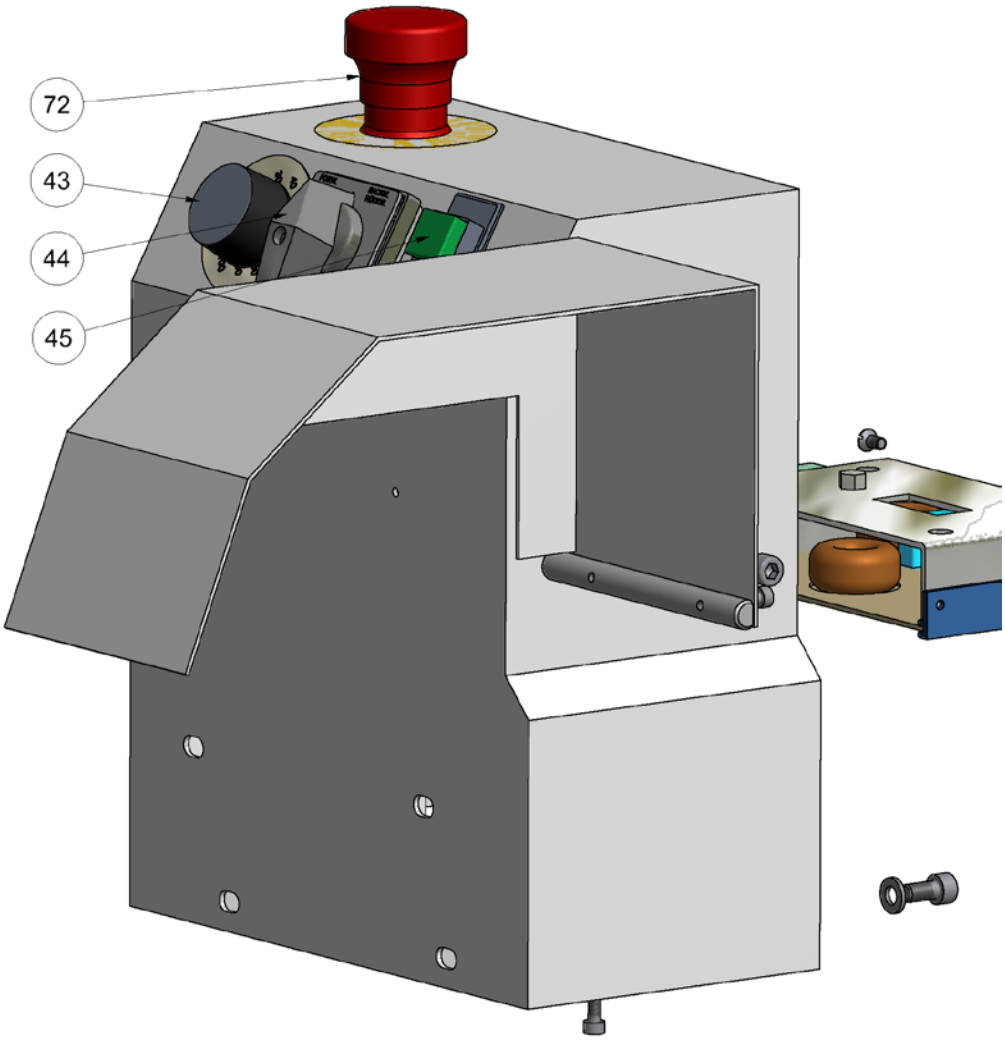
17. Operating elements



1. Potentiometer rotating knob for speed selection of the electrical drive motor
2. Emergency off switch
3. Turn switch for forwards-reverse - main spindle
4. ON/OFF switch with low voltage trigger
5. Switch lever for opening and closing the clasp nut
6. Holding screw for longitudinal skid
7. Tensioning nut for tool clamping plate
8. Ball crank for adjusting the transverse skid
9. Hand wheel for quickly adjusting the tool skid
10. Clamping screw for clamping the tool skid
11. Ball crank for adjusting the longitudinal skid
12. Clamping lever for securing the tailstock sleeve
13. Lever for securing the tailstock to the guides
14. Ball crank for adjusting the tailstock sleeve
15. Tensioning nut for securing the tailstock to the guides
16. Safety screw for the drive protection hood
17. Chuck protection hood

18. Drawings and legends

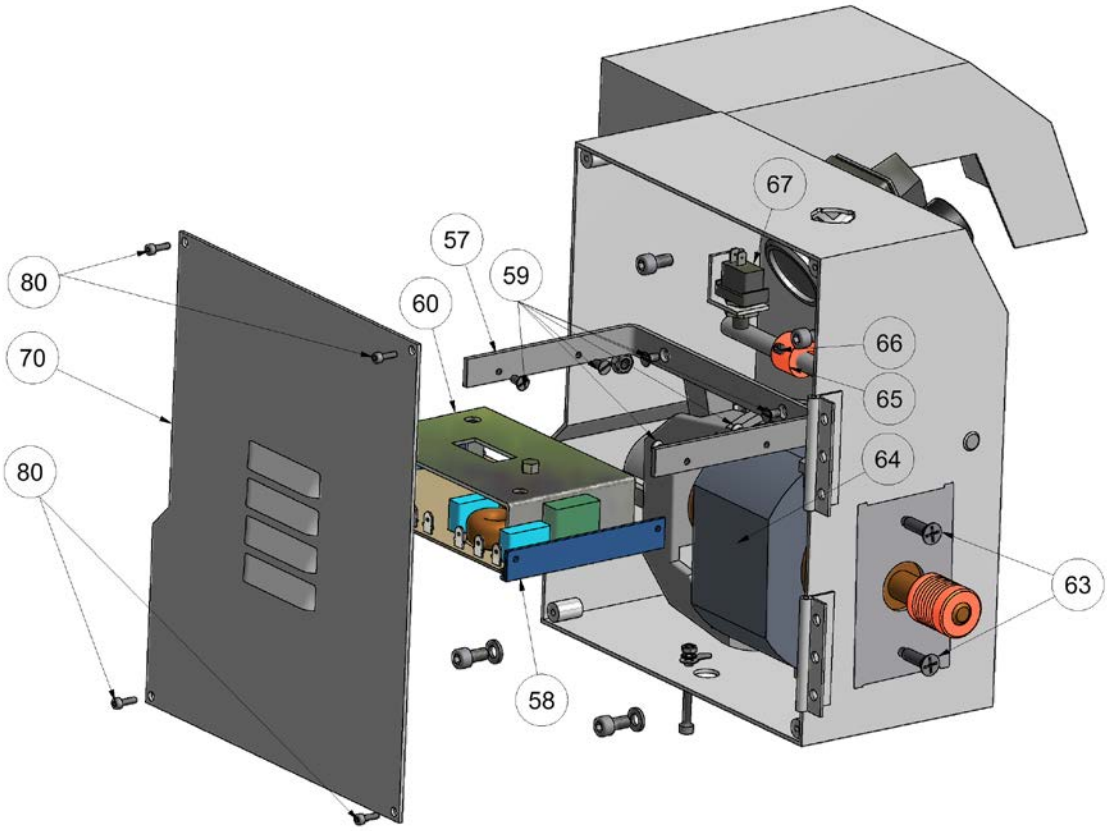
18.1 Electronic console



Part No.	Items	Order No.	Description
43	1	51500807-0001	Potentiometer with cable and connector
43.1	1	51500807-00011	Potentiometer, complete
44	1	51500608	Turn switch
45	1	51500606-0001	On-Off switch
72	1	51500624-0001	Emergency off button, complete

18. Drawings and legends

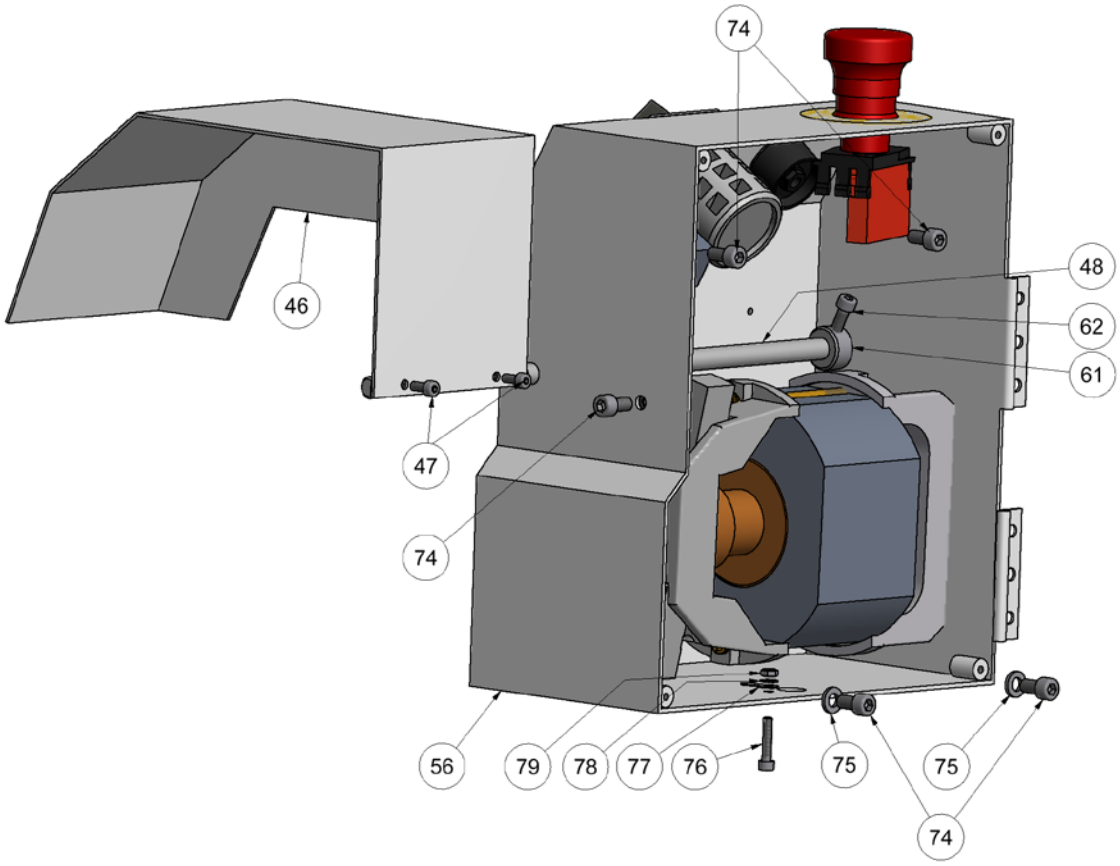
18.1 Electronic console



Part No.	Items	Order No.	Description
57	1	51001015-00021	Board holder with guide rails
59	6	16196500004008	Screw
60	1	51501402	Control board
63	2	16179910006020	Screw
64	1	51500102-0002	Motor
65	1	51004020-0003	Eccentric tappet
66	1	16191300005006	Threaded pin
67	1	51500619	End switch
70	1	51400405-0001	Cover plate
80	4	16191200004010	Screw

18. Drawings and legends

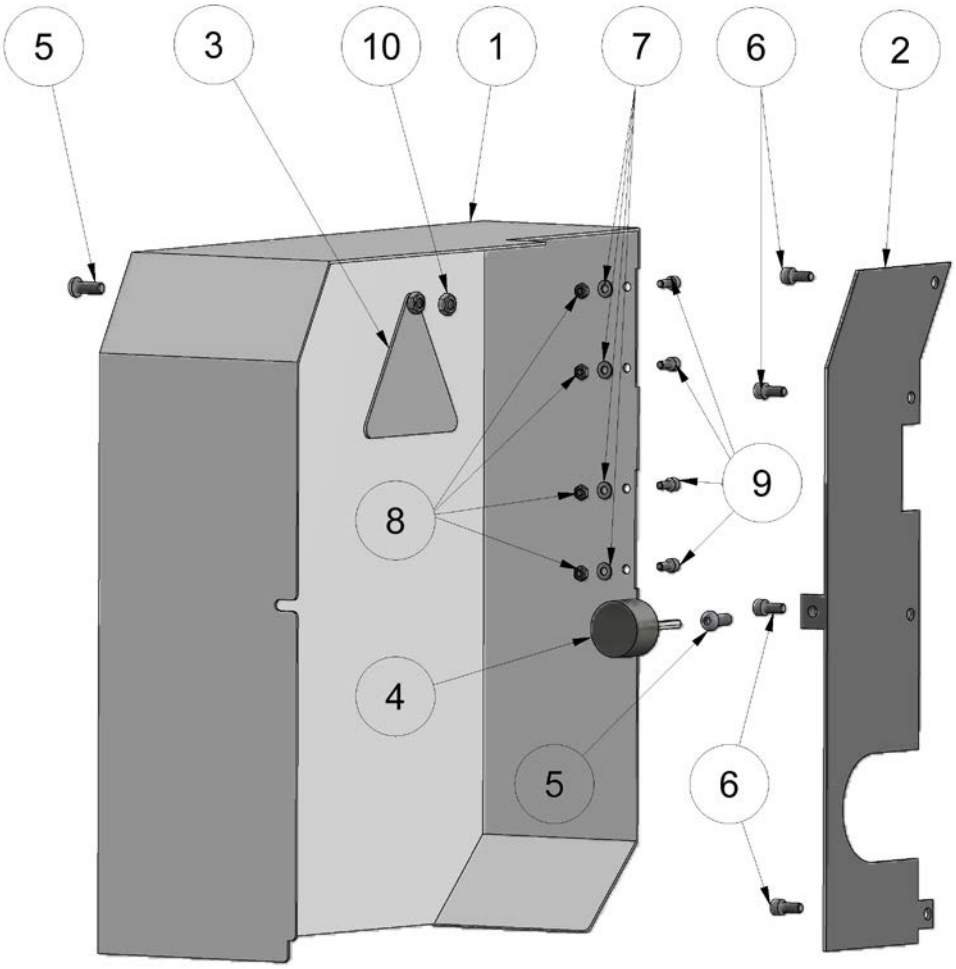
18.1 Electronic console



Part No.	Items	Order No.	Description
46	1	51400403-0001	Chuck protective hood
47	2	16191200004010	Screw
47.1	2	16112500004000	Washer
48	1	51004010-0010	Guide rod
56	1	51400406-0001	Electronic housing
61	1	160705A0010000	Adjusting ring
62	1	16191200005020	Screw
74	5	16191200006012	Screw
75	2	16112500006001	Washer
76	1	16191200004016	Screw
77	1	51501304	Symbol for earthed connection
78	2	16167980004000	Fanned washer
79	2	16193400004000	Nut

18. Drawings and legends

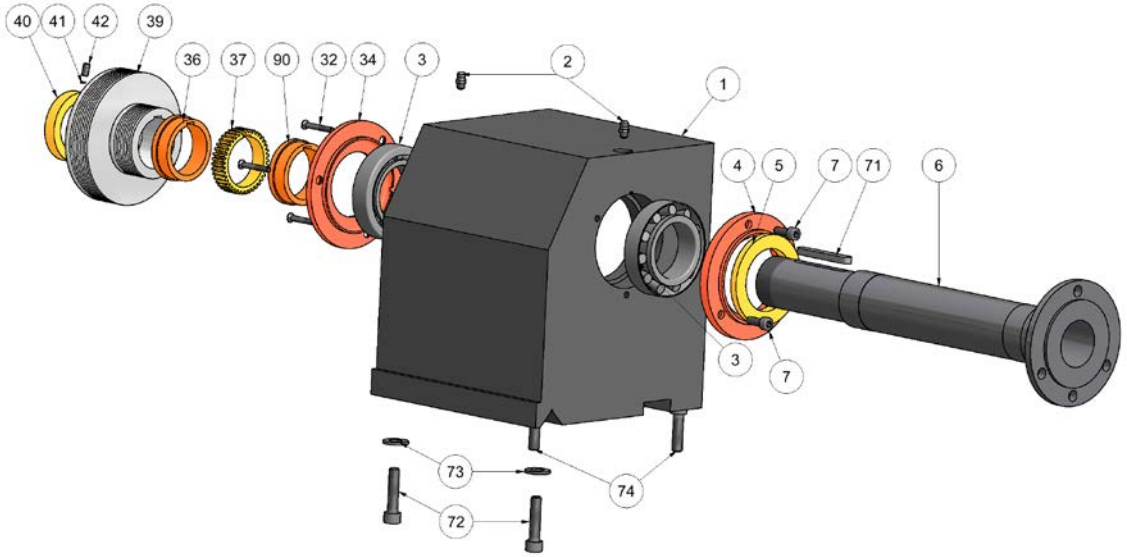
18.2 Protective hood, drive 1.4 kW motor



Part No.	Items	Order No.	Description
1	1	51400401-0001	Protective hood, drive
2	1	51400404-0001	Protective plate, lead screw drive
3	1	51400485-0001	Protective plate, spindle aperture
4	1	51508001	Key KW 4 for safety screw
5	2	16173800006012	Safety screw
6	4	16191200005012	Screw
7	4	16112500004000	Washer
8	4	16193400004000	Nut
9	4	16191200004010	Screw
10	1	16193400006000	Nut

18. Drawings and legends

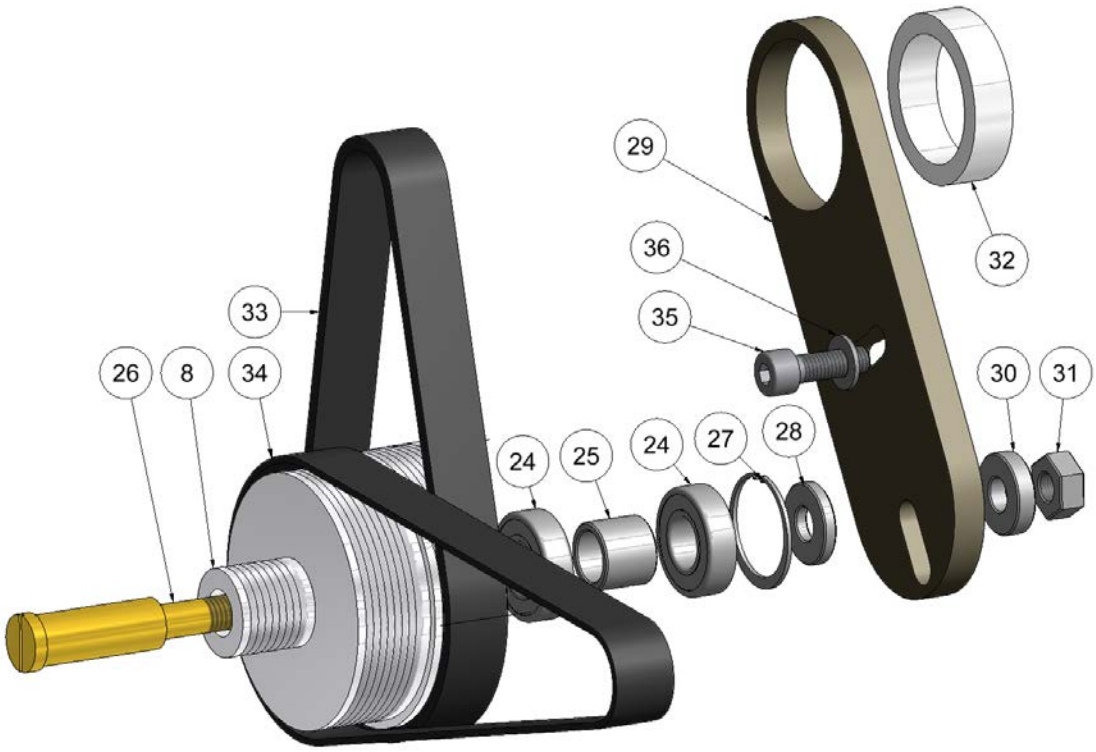
18.3 Headstock



Part No.	Items	Order No.	Description
1	1	10400104	Headstock
2	2	51502517	Lubrication nipple
3	2	51502108	Tapered roller bearing
4	1	10400105	Flange
5	1	10400107	Oil scraper ring
6	1	10400106	Main spindle
7	3	16191200006012	Screw
32	3	16196500006014	Screw
34	1	10400109	Flange
36	1	10400110	Sleeve
37	1	10400111	Toothed wheel
39	1	10400112	Gear wheel
40	1	10400113	Nut
41	1	51007250-0001	Push piece
42	1	16091300006006	Threaded pin
71	1	1606885A100670	Parallel key
72	2	16191200008035	Screw
73	2	16112500008001	Washer
74	2	16191200008030	Screw
90	1	10400190	Bush with collar

18. Drawings and legends

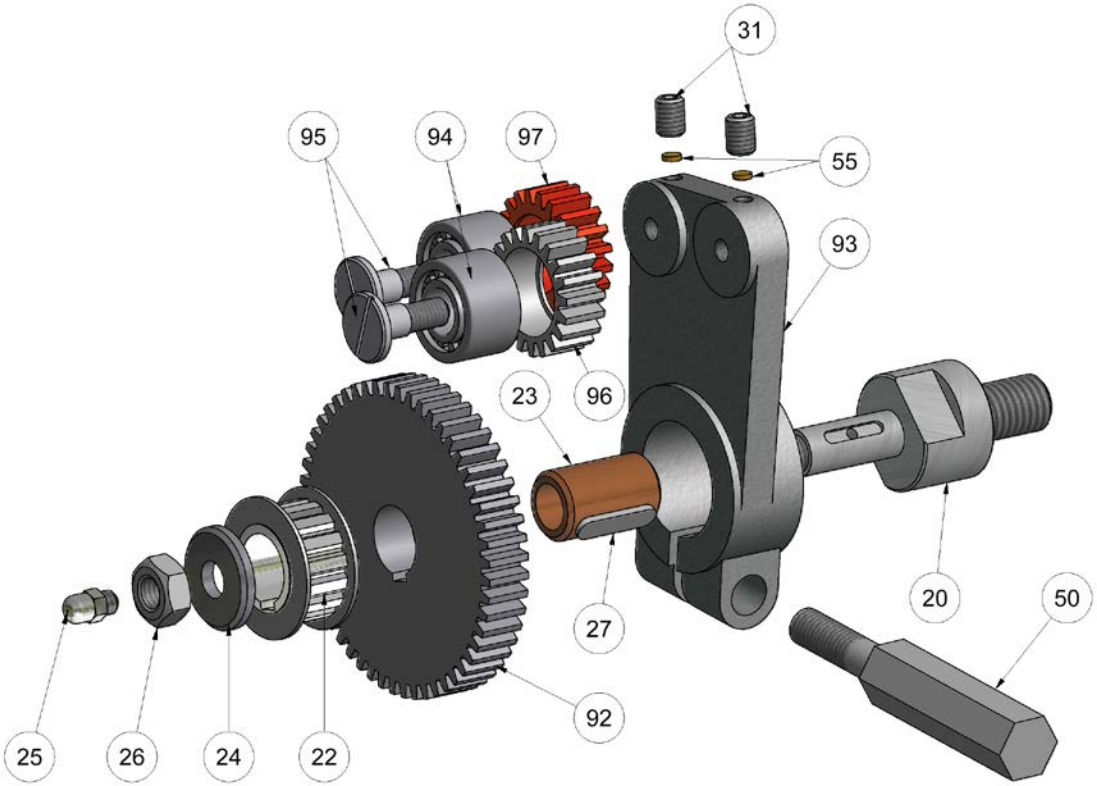
18.4 Headstock – Transmission



Part No.	Items	Order No.	Description
8	1	10600117	Gear wheel
24	2	51502113	Ball bearing
25	1	10600116	Sleeve
26	1	10600109	Axes
27	1	16047200032000	Securing ring
28	1	51004020-0022	Pressure washer
29	1	10400129	Transmission lever
30	1	10400130	Washer
31	1	16193400010000	Nut
32	1	51006750-0004	Centering ring
33	1	51502308	Belt
34	1	51502315	Belt
35	1	16191200008025	Screw
36	1	16112500008001	Washer

18. Drawings and legends

18.5 Headstock – Tumbler gear



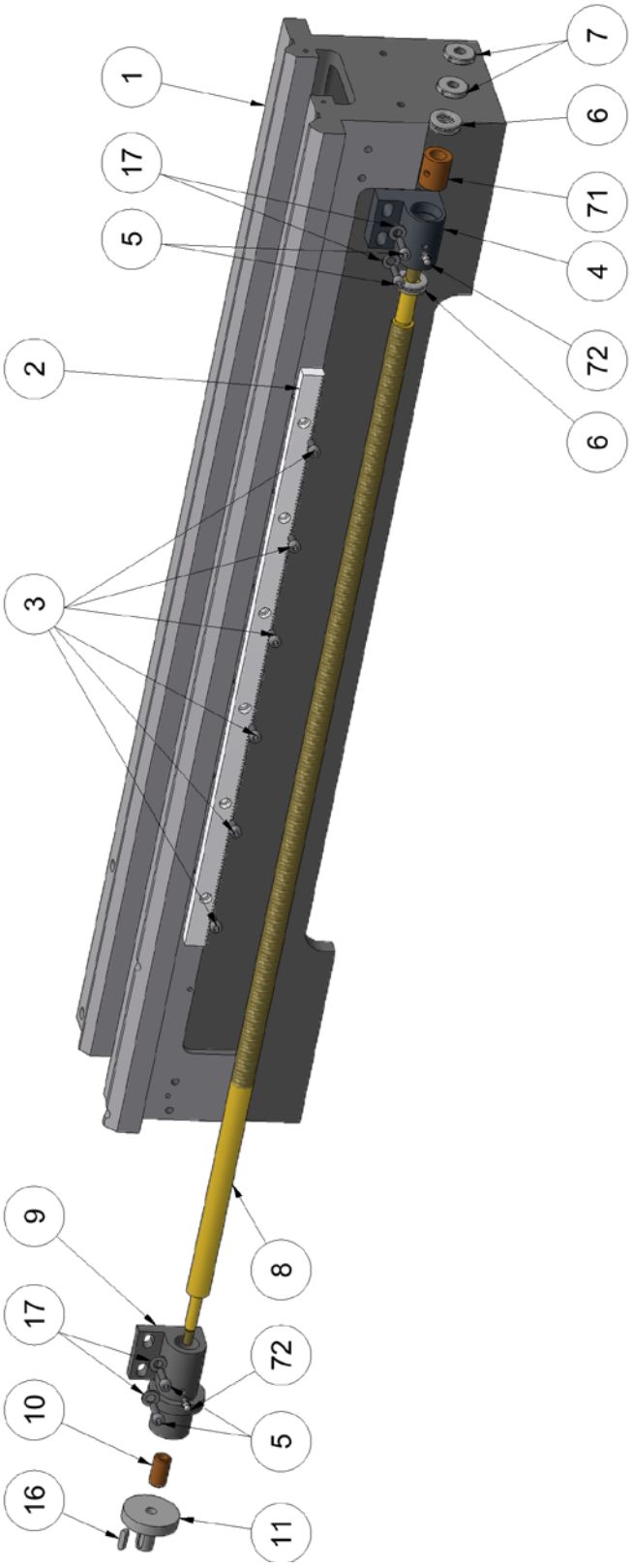
18. Drawings and legends

18.5 Headstock – Tumbler gear

Part No.	Items	Order No.	Description
20	1	51004025-0033	Bolt
22	1	51006530-00011	Toothed belt wheel Z16
23	1	51007016-0003	Sleeve
24	1	51004020-0010	Washer
25	1	51502518	Lubrication nipple
26	1	16193400008000	Nut
27	1	1606885A050320	Parallel key
31	2	16191300005006	Threaded pin
50	1	10600198	Clamping screw
51	2	51007250-0001	Push piece
92	1	10400140	Toothed wheel
93	1	10400135	Lever
94	2	51502136	Ball bearing
95	2	51004015-0004	Bolt
96	1	10600196	Toothed wheel
97	1	51008530-0002	Toothed wheel, plastic

18. Drawings and legends

18.6 Bed with lead screw



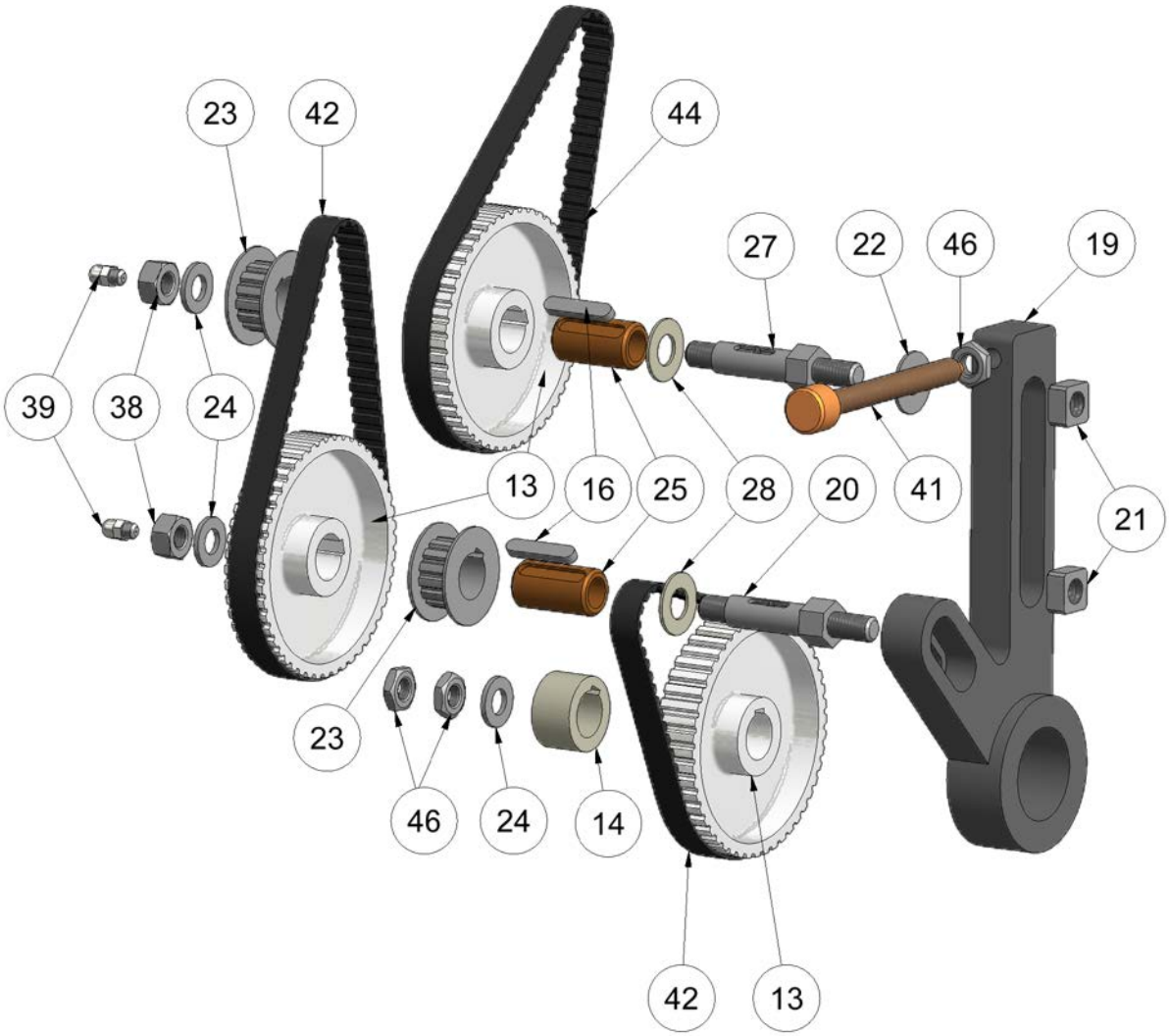
18. Drawings and legends

18.6 Bed with lead screw

Part No.	Items	Order No.	Description
1	1	10400203	Bed
2	1	10400201	Gear rod
3	6	16191200005016	Screw
4	1	10400207	Support bearing, right
5	4	16191200006020	Screw
6	2	51502137	Ball bearing
7	2	10400214	Capstan nut
8	1	10400206	Lead screw
9	1	10400204	Support bearing, left
10	1	10400205	Sleeve
11	1	10400302	Safety clutch
16	1	1606885A050325	Parallel key
17	4	16112500006001	Washer
71	1	10400210	Sleeve
72	2	51502517	Lubrication nipple

18. Drawings and legends

18.7 Change gear quadrant



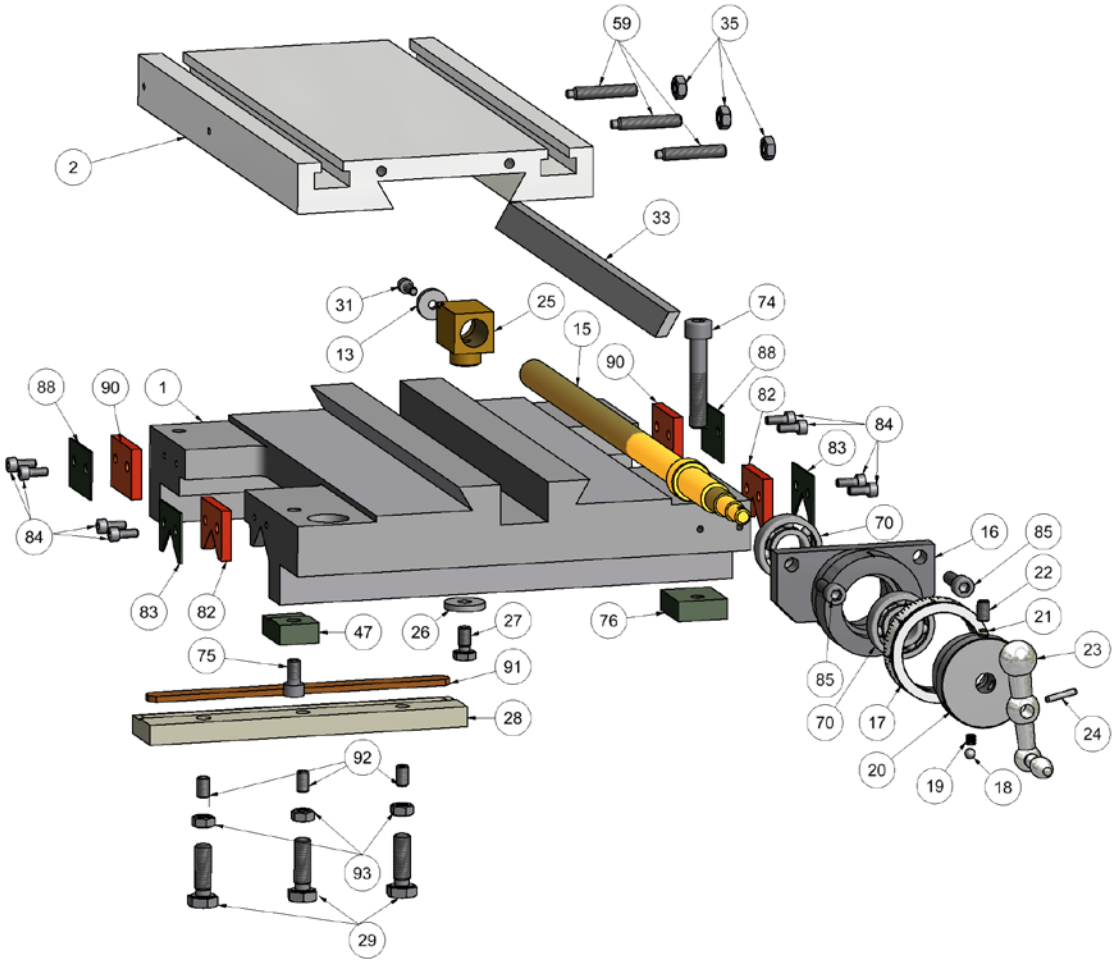
18. Drawings and legends

18.7 Change gear quadrant

Part No.	Items	Order No.	Description
13	3	51006580-0004	Toothed belt wheel Z48
14	1	10600214	Sleeve
16	2	1606885A050325	Parallel key
19	1	10400301	Change gear quadrant
20	1	51004633-0001	Change gear bolt, long
21	2	16155700008000	Nut
22	2	10600222	Washer
23	2	51006525-00011	Toothed belt wheel Z14
24	3	51004020-0010	Washer
25	2	51007016-0001	Change gear sleeve
27	1	51004633-0002	Change gear bolt, short
28	2	16000000010201	Washer
38	2	16193400008000	Nut
39	2	51502518	Lubrication nipple
41	1	10600241	Setting screw
42	2	51502320	Gear belt
44	1	51502323	Gear belt
46	3	16143900008000	Nut
	1	51006530-00011	Toothed belt wheel Z16
	1	51006530-00021	Toothed belt wheel Z18
	1	51006535-00011	Toothed belt wheel Z20
	1	51006540-0001	Toothed belt wheel Z22
	1	51006540-00021	Toothed belt wheel Z24
	1	51006545-0003	Toothed belt wheel Z26
	1	51006545-0001	Toothed belt wheel Z28
	1	51006555-0001	Toothed belt wheel Z32
	1	51006555-0004	Toothed belt wheel Z34
	1	51006560-00011	Toothed belt wheel Z36
	1	51006565-0001	Toothed belt wheel Z40

18. Drawings and legends

18.8 Tool skid – Transverse skid



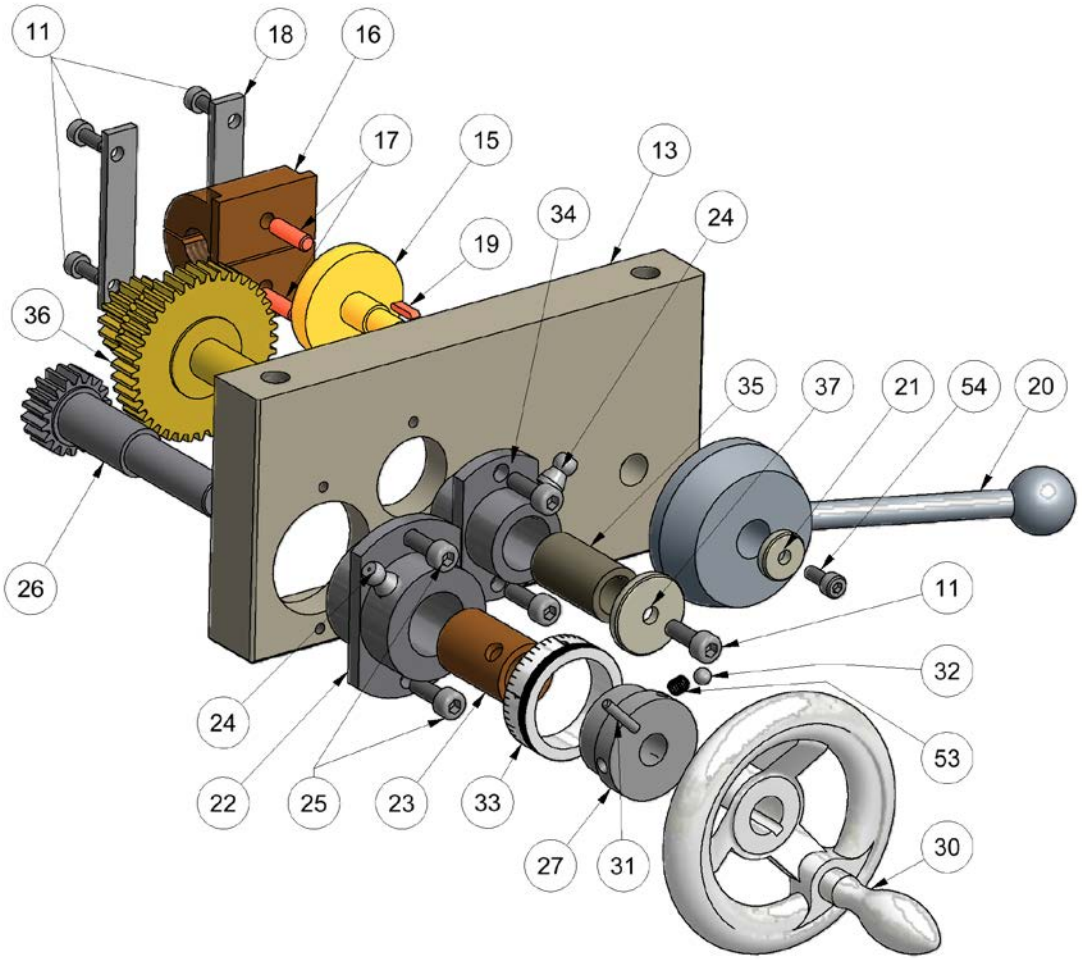
18. Drawings and legends

18.8 Tool skid – Transverse skid

Part No.	Items	Order No.	Description
1	1	10400401	Transverse skid, lower section
2	1	10400405	Transverse skid, upper section
13	1	10400452	Washer
15	1	51004016-0007	Spindle
16	1	10400454	Spindle bearing
17	1	10400433	Scale ring
18	1	51502131	Steel ball
19	1	51502009	Pressure spring
20	1	51004035-0010	Dial
21	3	51007250-0001	Push piece
22	3	16191300005006	Threaded pin
23	1	51507023-0001	Ball crank
24	1	16073430003014	Spiral tensioning pin
25	1	10400402	Spindle nut
26	1	10400403	Washer
27	1	16193300005010	Screw
28	1	10400446	Guide bar
29	3	16193300006016	Screw
31	1	16191200004010	Screw
33	1	10400406	Adjustment bar
35	3	16193400005000	Nut
47	1	10400440	Guide element
59	3	16091500005035	Spindle nut with adjusting nut
70	2	51502116	Threaded pin
74	1	16191200006035	Ball bearing
75	1	16191200006012	Screw
76	1	10400438	Screw
82	2	10400407	Clamping piece
83	2	10400409	Felt
84	8	16191200004010	Felt clamp
85	2	16191200005016	Screw
88	2	10400410	Screw
90	2	10400408	Felt clamp
91	1	10400447	Felt
92	3	16191300005012	Setting bar
93	3	16193400005000	Threaded pin

18. Drawings and legends

18.9 Tool skid – Lock plate



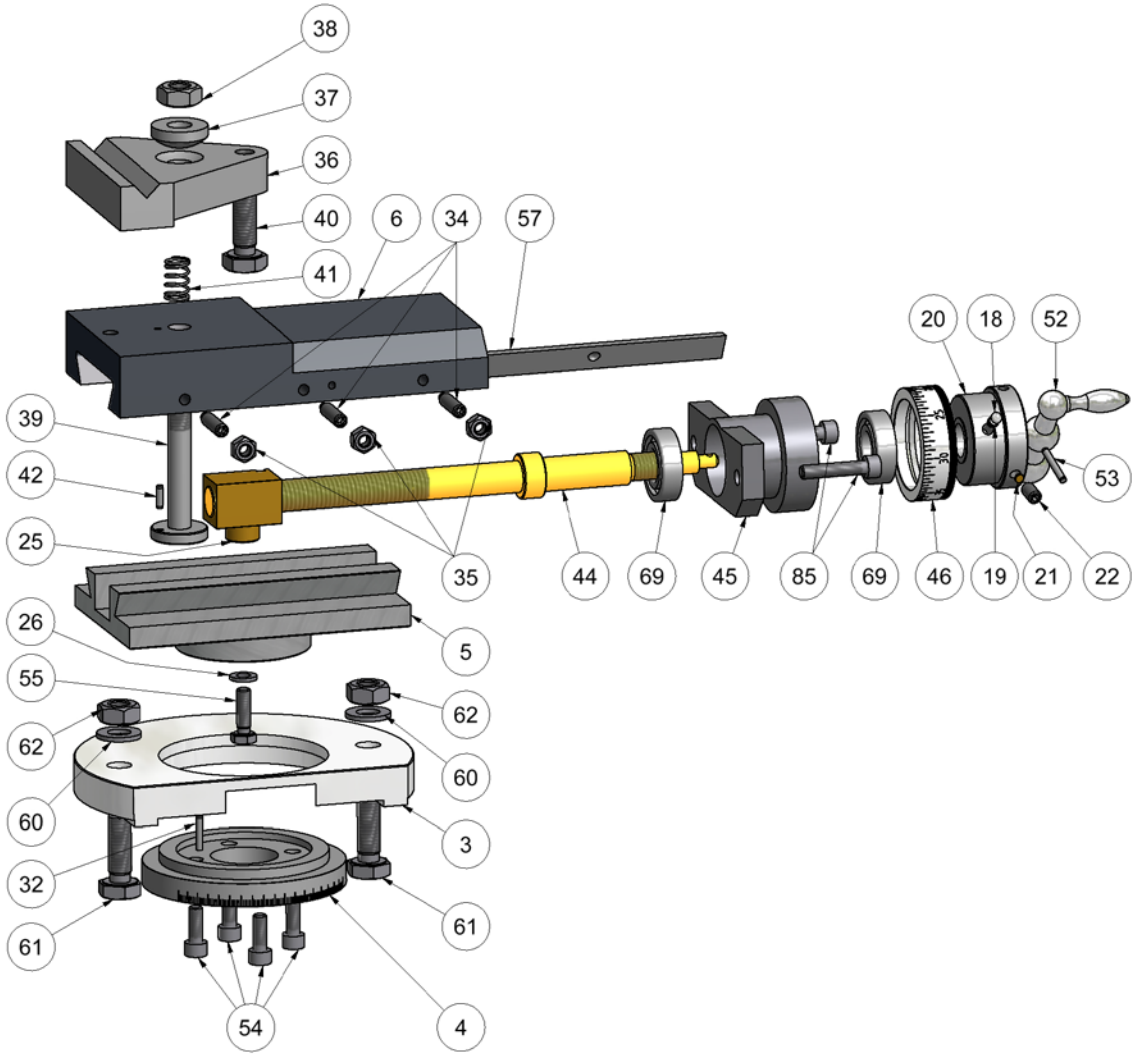
18. Drawings and legends

18.9 Tool skid – Lock plate

Part No.	Items	Order No.	Description
11	5	16191200004010	Screw
13	1	10400413	Lock plate
15	1	51004040-0001	Keylock switch
16	1	10400416	Clasp nut
17	2	16063250005016	Pin
18	2	10400417	Guide bar
19	1	1606885A040408	Parallel key
20	1	51507040-0001	Switch lever
21	1	51004015-0006	Washer
22	1	51006555-0021	Flange
23	1	10400423	Sleeve
24	2	51502517	Lubrication nipple
25	4	16191200005016	Screw
26	1	10400426	Pinion
27	1	51004035-0011	Dial
30	1	51507041-0001	Hand wheel
31	1	16073430003024	Spiral tensioning pin
32	1	51502131	Steel ball
33	1	10400433	Scale ring
34	1	51006545-0004	Flange
35	1	10400435	Sleeve
36	1	10400436	Intermediate gear
37	1	51004020-0004	Washer
53	1	51502009	Pressure spring
54	1	16191200003010	Screw

18. Drawings and legends

18.10 Tool skid – Longitudinal skid



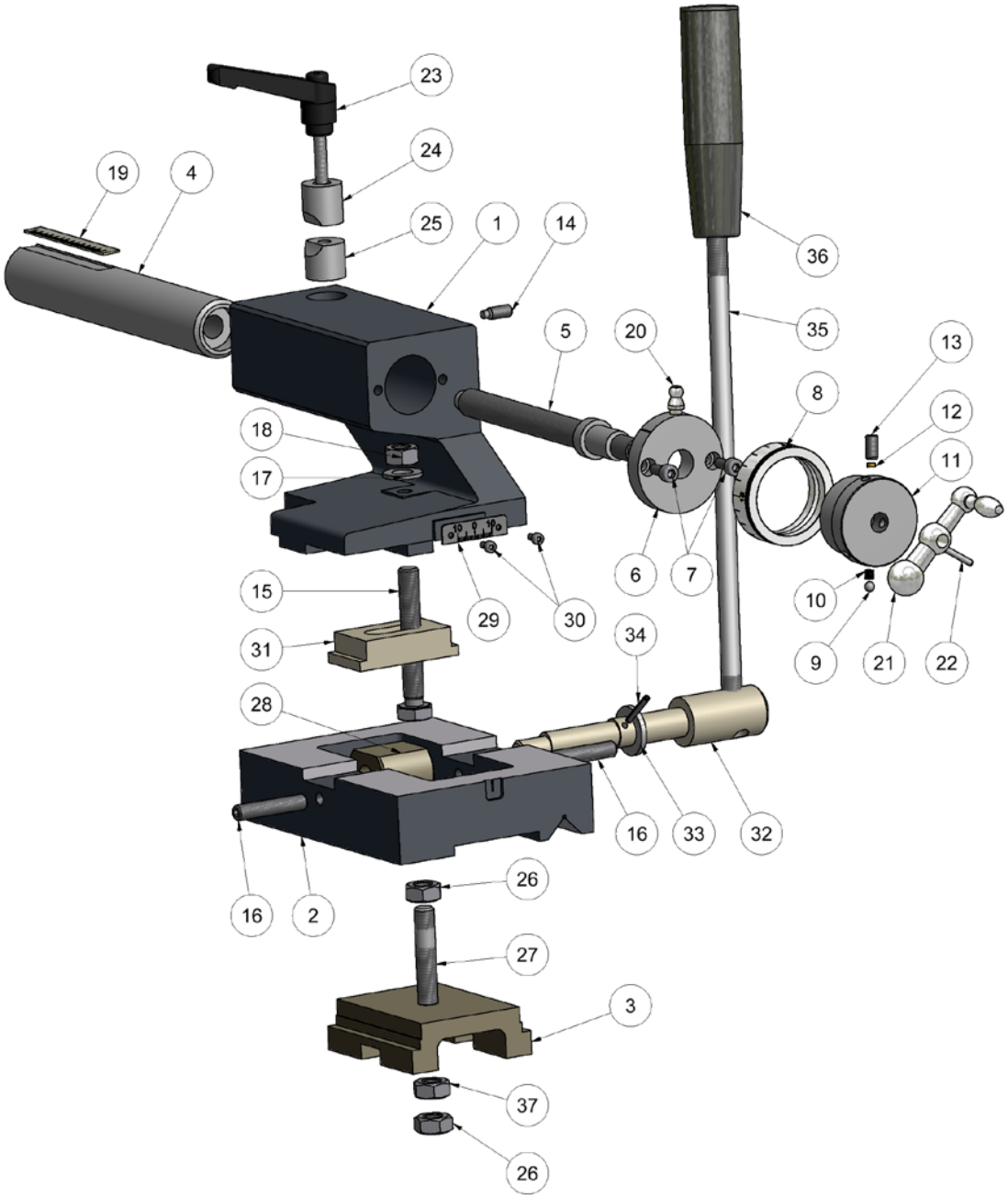
18. Drawings and legends

18.10 Tool skid – Longitudinal skid

Part No.	Items	Order No.	Description
3	1	10400505	Clamping ring
4	1	10400502	Guide ring
5	1	10400501	Longitudinal skid, lower section
6	1	10400507	Longitudinal skid, upper section
18	1	51502131	Steel ball
19	1	51502009	Pressure spring
20	1	51004035-0010	Dial
21	3	51007250-0001	Push piece
22	3	16091300005006	Threaded pin
25	1	10400506	Spindle nut
26	1	10400517	Washer
32	1	16073430004014	Spiral tensioning pin
34	3	16091500005020	Threaded pin
35	3	16193400005000	Nut
36	1	10400513	Clamping jaw
37	1	10400514	Pressure washer
38	1	16193400008000	Hexagonal nut,
39	1	10400509	Threaded bolt
40	1	16193300008030	Hexagonal screw
41	1	51502010	Pressure spring
42	1	16073430003008	Spiral tensioning pin
44	1	51004016-0008	Spindle
45	1	10400519	Spindle bearing
46	1	10400528	Scale ring
52	1	51507023-0001	Ball crank
53	1	16073430003014	Spiral tensioning pin
54	4	16191200005010	Screw
55	1	16191200005016	Screw
57	1	10400508	Adjustment bar
61	2	10400470	T-groove screw
62	2	16143900008000	Nut
69	2	51502116	Ball bearing
85	2	16191200005016	Screw

18. Drawings and legends

18.11 Tailstock



18. Drawings and legends

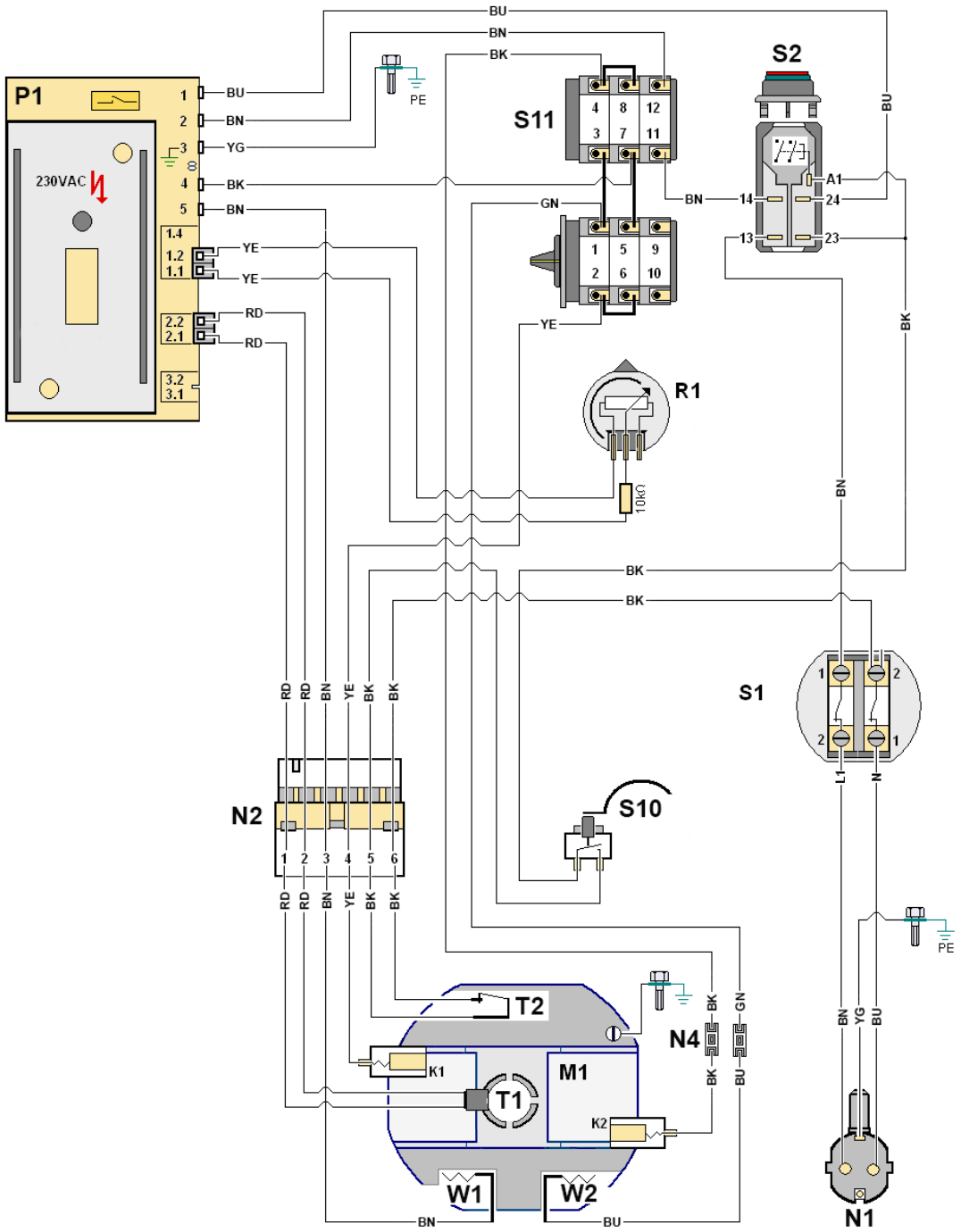
18.11 Tailstock

Part No.	Items	Order No.	Description
1	1	10400601	Tailstock upper section
2	1	10400608	Tailstock lower section
3	1	10400610	Clamping piece
4	1	10400604	Sleeve
5	1	51004020-0016	Spindle
6	1	51006550-0003	Flange
7	2	16191200006016	Screw
8	1	10400624	Scale ring
9	1	51502131	Steel ball
10	1	51502009	Pressure spring
11	1	51004035-0012	Dial
12	3	51007250-0001	Push piece
13	3	16191300005006	Threaded pin
14	1	16091500006016	Threaded pin
15	1	16193100008060	Screw
16	2	16091500006020	Threaded pin
17	1	51004020-0010	Washer
18	1	16193400008000	Nut
19	1	10400605	Scale tape
20	1	51502517	Lubrication nipple
21	1	51507023-0001	Ball crank
22	1	16073430003014	Spiral tensioning pin
23	1	51507033	Tensioning lever
24	1	10400601	Sleeve clamping element, top
25	1	10400602	Sleeve clamping element, bottom
26	2	16043900008000	Nut
27	1	16191300008040	Threaded pin
28	1	10400636	Clamping bush
29	1	10400614	Scale
30	2	16191200003010	Screw
31	1	10400632	Clamping strap
32	1	51004020-0018	Eccentric shaft
33	1	51004020-0023	Washer
34	1	16073430003018	Spiral tensioning pin
35	1	10400634	Lever
36	1	10600436	Handle
37	1	16193400008000	Nut

19. Circuit diagram

19.1 For 1.4 kW motor

This document shows all the equipment for the electrical set-up
including connection to the power supply network



19. Circuit diagram

19.2 Key for circuit diagram

Color-code by IEC 60757

BK	Black	PK	Pink
BN	Brown	RD	Red
BU	Blue	VT	Violet
GN	Green	WH	White
GY	Grey	YE	Yellow
OG	Orange	YG	Yellow/Green

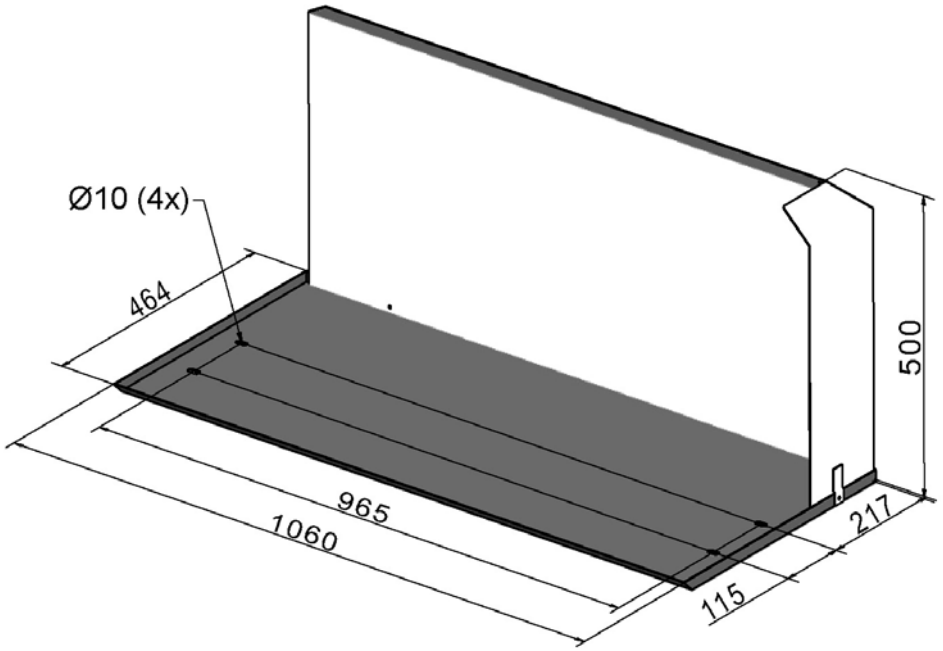
M1	Main spindle motor
N1	Power plug
N2	Motor plug
N4	Clamping bar
P1	Motor control board
R1	220 k (ohm) potentiometers spindle speed
S1	Emergency switch-off
S2	Main switch
S10	End switch chuck -cover
S11	Turn switch spindle right/left
T1	Speedometer
T2	Thermistor
W1	Coil 1
W2	Coil 2

20. Shavings tank with spray protection wall (optional)

20.1 Setting up the shavings tank with spray protection wall

When mounting the shavings tank with spray protection wall to a WABECO tool cabinet, the appropriate bores are already present. The tool cabinet ensures a safe base for the lathe or shavings tank with spray protection wall.

If the shavings tank with spray protection wall is secured to another suitable surface, the four through holes must be bored into the surface by the client. For the positions of the four drilled holes for the lathe or shavings tank with spray protection wall, see the diagram. The diameter of the through holes in the surface must be at least 9 mm.



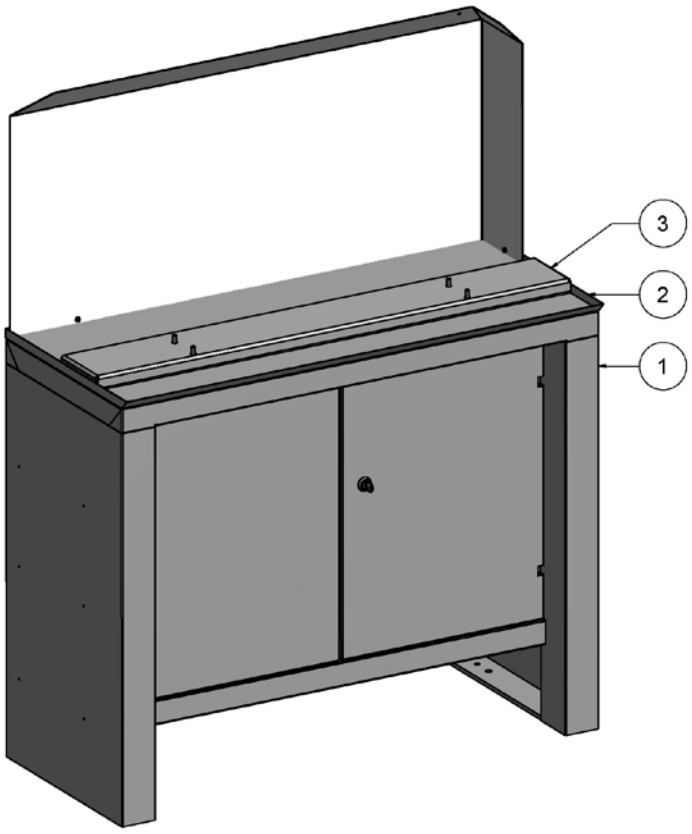
20. Shavings tank with spray protection wall (optional)

20.2 Mounting the shavings tank with spray protection wall on the tool cabinet (optional)

- The shavings tank with spray protection wall (2) is positioned, as shown, on the tool cabinet (1).
- The screws and washers required for assembly are included in the scope of delivery.

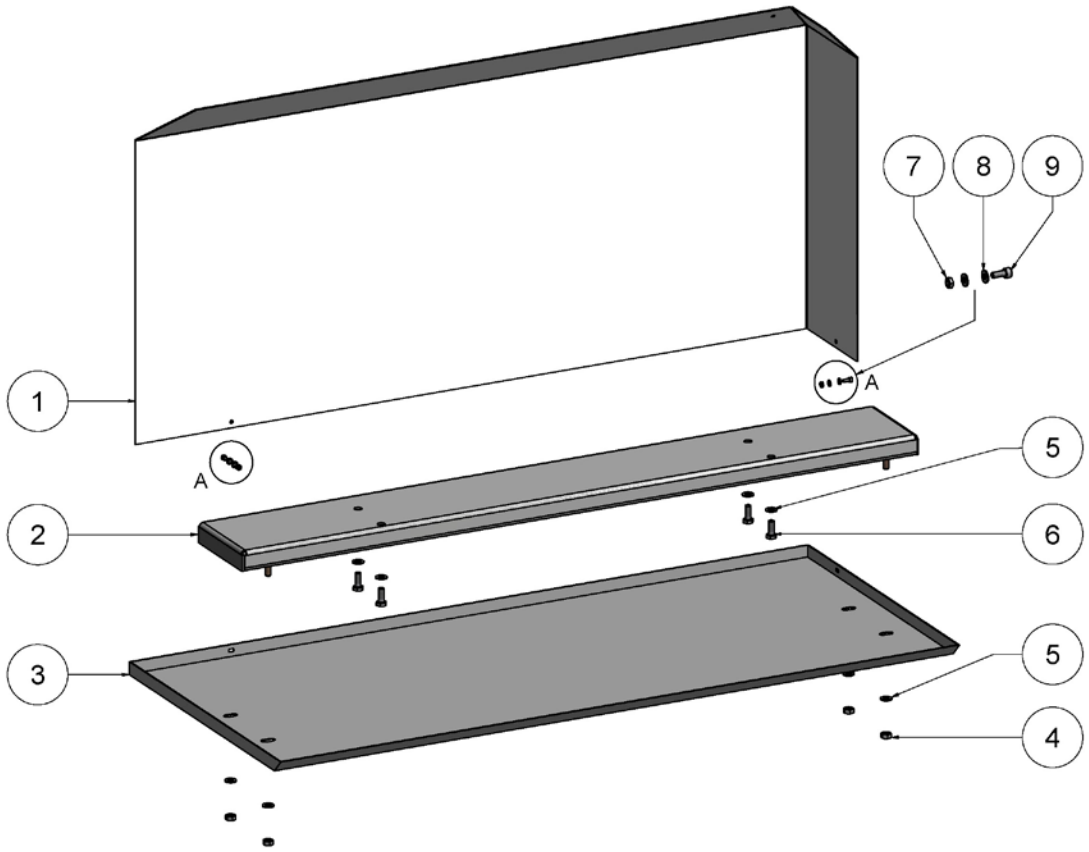
To screw the shavings tank with spray protection wall to the tool cabinet proceed as follows:

1. Place the lathe carefully onto the panel (3) and align along the fixing holes.
2. Combine each screw with a washer.
3. Push the screws from below, through the fixing holes in the panel (3) and into the fixture thread on the bed of the lathe and tighten using a size 13 combination wrench.
4. Place the lathe with panel carefully onto the shavings tank with spray protection wall and align along the fixing holes.
5. Open the doors of the tool cabinet.
6. Combine each nut with a washer and screw from below the nuts onto out of the panel (3) protruding threaded bolt.
7. Tighten the four nuts using a size 13 combination wrench.



20. Shavings tank with spray protection wall (optional)

20.3 Drawing and legend



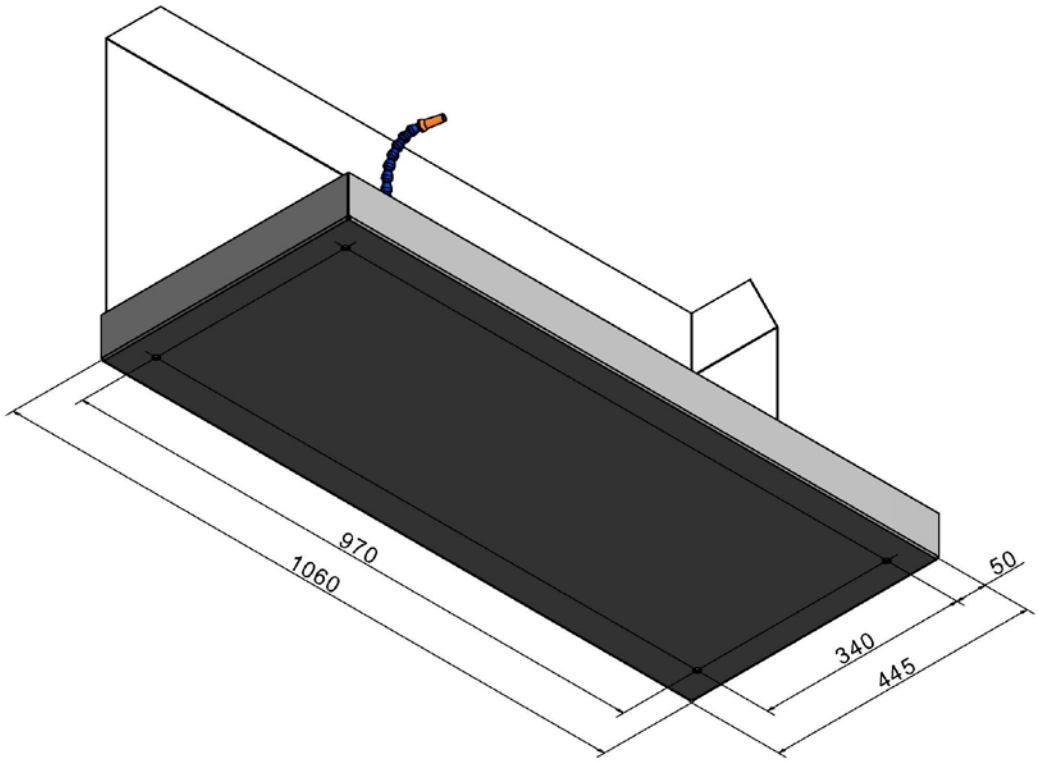
Part No.	Items	Order No.	Description
1	1	51400235-0001	Spray protection wall
2	1	51400607-0001	Panel
3	1	51400484-0001	Shavings tank
4	4	16193400008000	Nut
5	8	16112500008001	Washer
6	4	16193300008020	Screw
7	2	16193400004000	Nut
8	4	16112500004000	Washer
9	2	16191200004010	Screw

21. Coolant system (optional)

21.1 Setting up the coolant system

When mounting the coolant system to a WABECO tool cabinet, the appropriate bores are already present. The tool cabinet ensures a safe base for the lathe or coolant system.

If the coolant system is secured to another suitable surface, the four through holes must be bored into the surface by the client. For the positions of the four fixtures threaded sockets (thread M8) of the coolant system, see diagram. The diameter of the through holes in the surface must be at least 9 mm.



21.2 Mounting of the coolant system to the tool cabinet (optional)

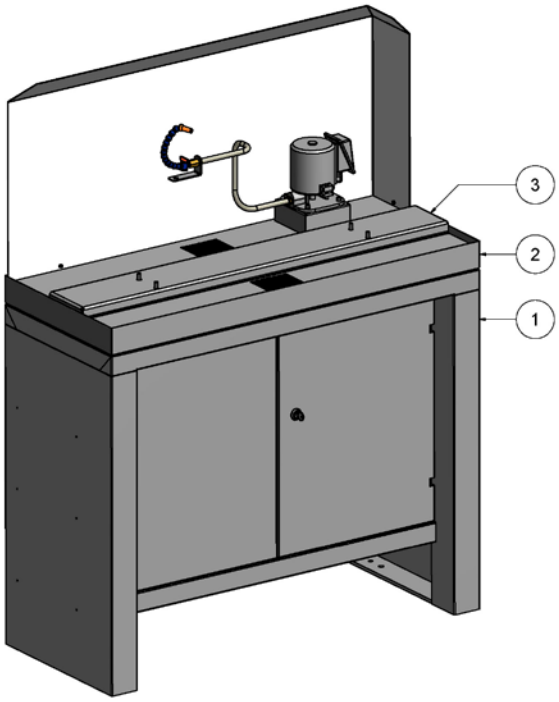
- The coolant system (2) is positioned, as shown, on the tool cabinet (1), the panel (3) is not important in this stage.
- The screws and washers required for assembly are included in the scope of delivery.

To screw the coolant system to the tool cabinet proceed as follows:

1. Combine each hexagon socket screw with a washer.
2. Open the doors of the tool cabinet.
3. Push the screws from below, through the bored holes in the tool cabinet, into the fixture threaded sockets and tighten using an Allen key of size 6.

21. Coolant system (optional)

21.2 Mounting of the coolant system to the tool cabinet (optional)



To screw the lathe to the coolant system proceed as follows:

1. Place the lathe carefully onto the panel (3) and align along the fixing holes.
2. Combine each hexagon socket screw with a washer.
3. Push the screws from below, through the fixing holes in the panel (3) and into the fixture thread on the bed of the lathe and tighten using a size 13 combination wrench.
4. Place the lathe with the panel carefully onto the coolant system and align along the fixing holes.
5. Remove both inlay sheets out of the coolant system.
6. Combine each nut with a washer and screw from below the nuts onto out of the panel (3) protruding threaded bolt.
7. Tighten the four nuts using a size 13 combination wrench.

21. Coolant system (optional)

21.3 Safety regulations for the handling of cooling lubricant

1. Pay particular attention to leaked coolant as this can quickly cause people to slip and caused accidents as a result.
2. Secure your coolant system in such a way that it cannot be switched on by children. Persons who have not been trained may not operate the coolant system.
3. Ensure you have a clean workplace, dirty areas can quickly lead to accidents.
4. Never use the coolant system when processing magnesium alloys. In combination with water-mixed coolants, this may result in flammable gas mixtures which may explode under certain circumstances.
5. Avoid longer skin contact with the coolant.
6. Use skin protecting creams when handling coolants.
7. Regularly monitor the concentration of the water-mixed coolant.
8. Regularly monitor the pH value of the coolant.
9. Make sure that the coolant is only disposed of in an environmentally friendly way in accordance with the relevant guidelines. Coolant is a special waste product.

21.4 Filling the coolant system

A number of protective measures must be observed and taken in order to ensure that the handling of coolant does not cause health risks or environmental loads.

- Always observe the datasheet and the safety regulations of the coolant being used (can be obtained from the supplier or manufacturer)
- Observe all safety regulations set out in these operating instructions, in particular those that refer to the safe handling of coolants.
- In order to ensure reliable operation of the coolant pump, a minimum coolant filling level is required in the coolant tank.
- The capacity of the coolant system is approximately 19 liters.
- The maximum filling level should be just below the shelf insert
- The minimum filling level is approximately 15 mm below that.
- To fill, remove the shelf insert and fill to the maximum filling level with a suitable coolant whilst observing all safety regulations.
- After filling, replace the shelf insert

21. Coolant system (optional)

21.5 Operating the coolant system

The switch shown below is located on the mains cable of the coolant pump.

Switch position (0) → Pump switched off

Switch position (I) → Pump switched on

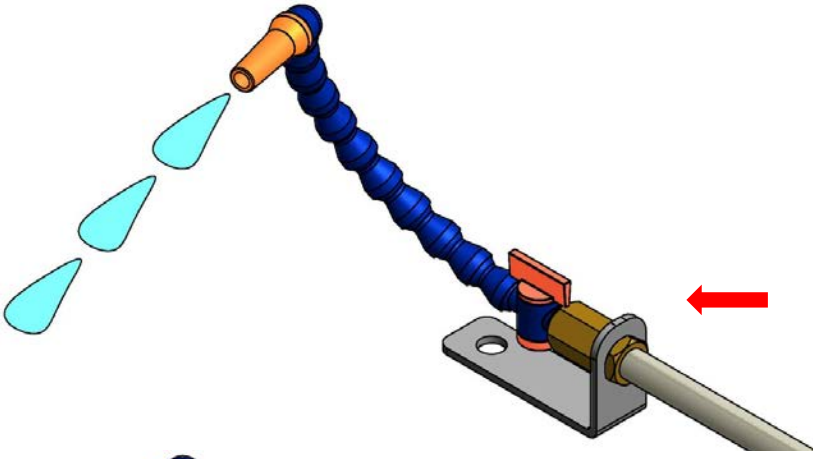
(Caution: Coolant flow is controlled with the coolant shut-off valve)

21. Coolant system (optional)

21.6 Positioning the segmented coolant hose

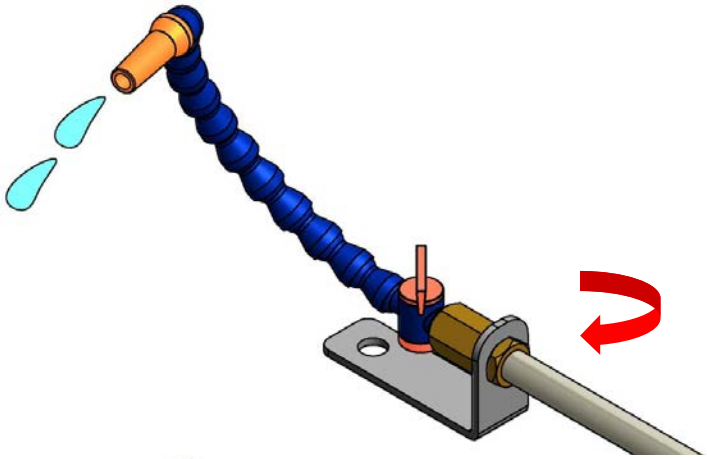
The flexible segmented hose (shown in blue) is made up of individually adjustable elements and can be shaped by hand or set as required. The segmented hose and the nozzle are to be positioned in such a way that the coolant flows as directly as possible onto the blade of the cutting tool of the lathe. Attention should be paid to ensure that the nozzle does not come into contact with the cutting tool.

21.7 Controlling the flow of coolant using the coolant shut-off valve



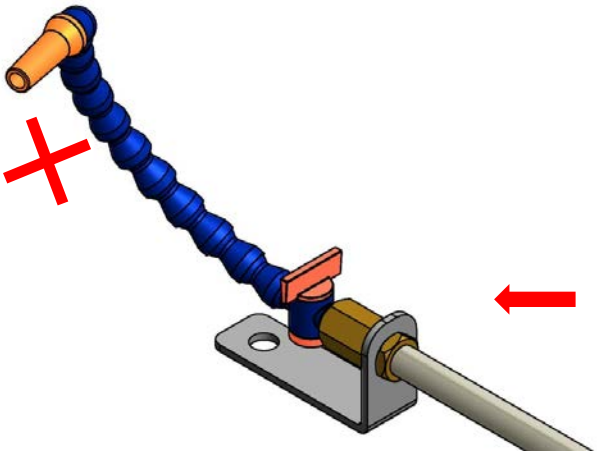
Coolant shut-off valve in the "open" position

→ Maximum coolant flow



Rotation of the coolant shut-off valve clockwise

→ Flow is reduced

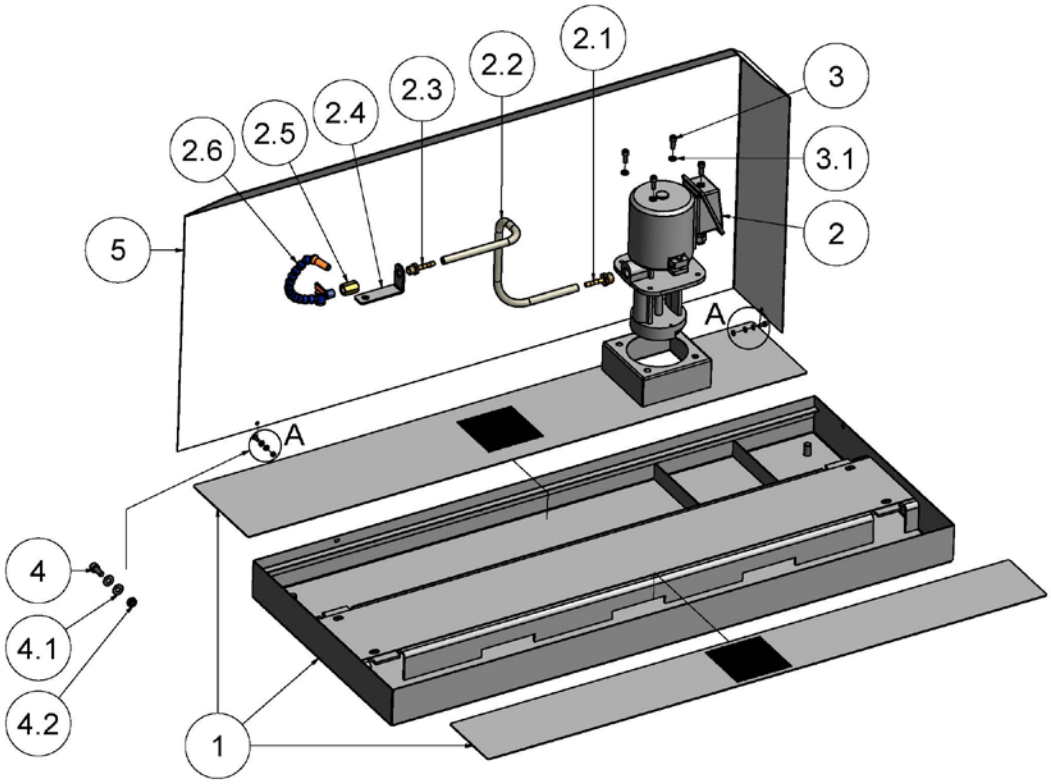


Coolant shut-off valve in the "closed" position

→ Coolant flow stopped

21. Coolant system (optional)

21.8 Drawing and legend

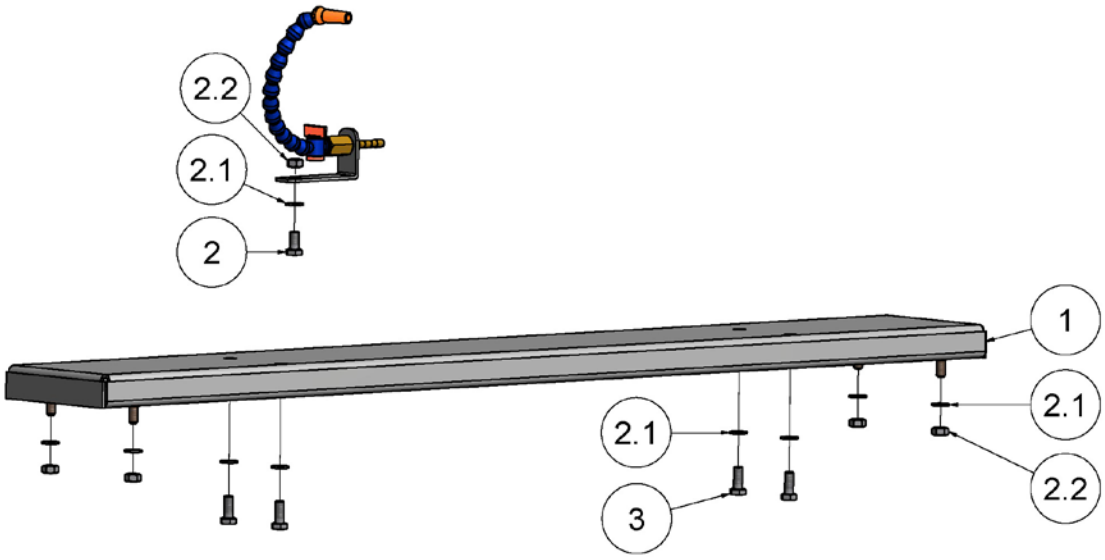


Part No.	Items	Order No.	Description
1	1	51401163-0001	Coolant system (tank and two shelf inserts)
2	1	51500119	Coolant pump
2.1	1	51504320	Screw-fitted hose bush
2.2	1	51504218	PVC fabric hose
2.3	1	51504318	Screw-fitted hose bush
2.4	1	51400400-0001	Bracket
2.5	1	51504349	Collar
2.6	1	51502507	Coolant hose with shut-off valve
3	4	16191200006016	Screw
3.1	4	16112500006001	Washer
4	2	16191200004010	Screw
4.1	4	16112500004000	Washer
4.2	2	16193400004000	Nut
5	1	51400235-0001	Spray protection wall 1060x445

21. Coolant system (optional)

21.8 Drawing and legend

Panel with screws for securing the lathe to the panel as well as screws for securing the panel to the coolant system and for securing the segmented coolant hose.



Part No.	Items	Order No.	Description
1	1	51400607-0001	Panel
2	1	16193300008016	Screw
2.1	9	16112500008001	Washer
2.2	5	16193400008000	Nut
3	4	16193300008020	Screw

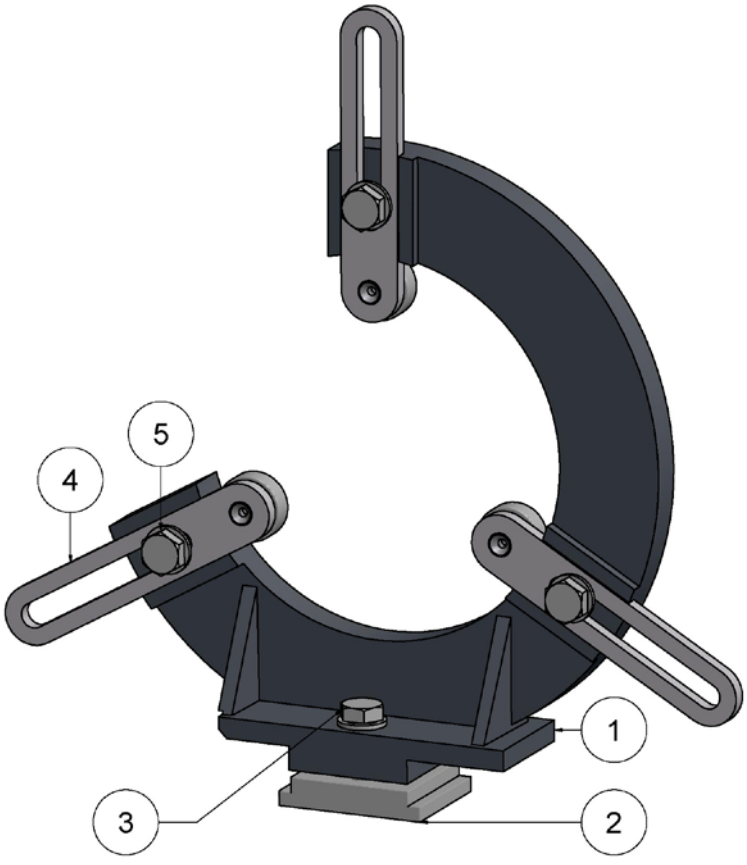
22. Fixed bezel (optional)

Bezels counteract the bending of longer shafts that is caused by shaving forces. The roll jaws prevent the bending of the turning elements.

They are to be set in such a way that the rotating axis of the work piece is precisely flush with the rotating axis of the machine. At the support position, the turning parts must be accurately rounded.

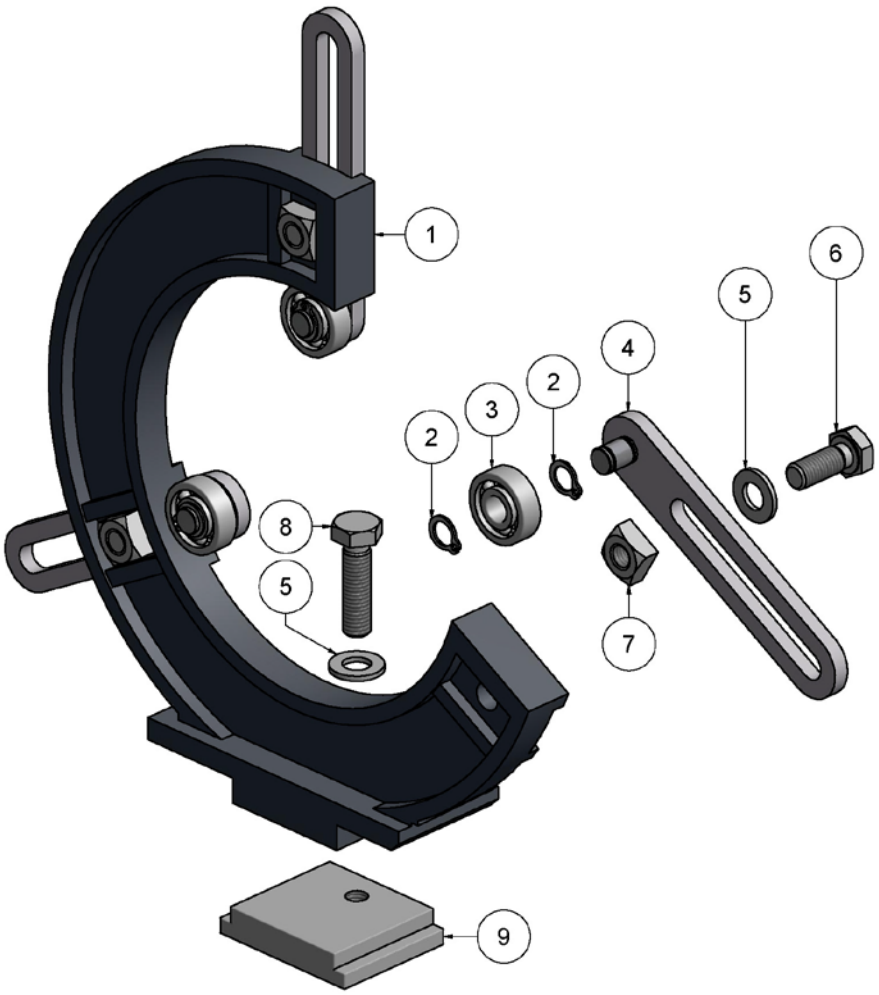
22.1 Operating the fixed bezel

1. The fixed bezel can be secured at any position on the prismatic bed.
2. The bezel (1) is fitted to the prismatic guide.
3. The clamping plate (2) is inserted, from below, into the prismatic bed and secured with the clamping screw (3).
4. The slider (4) can be moved by opening the clamping screws (5), afterwards the clamping screws (5) must be tightened up again.



22. Fixed bezel (optional)

22.2 Drawing and legend



Part No.	Items	Order No.	Description
1	1	51006831-0028	Basic body
2	6	16147100008000	Securing ring
3	3	51502117	Ball bearing
4	3	51401533-0001	Slider with axis
5	4	16112500008001	Washer
6	3	16193300008020	Screw
7	3	16155700008000	Nut
8	1	16193100008040	Screw
9	1	51002051-0002	Clamping bar

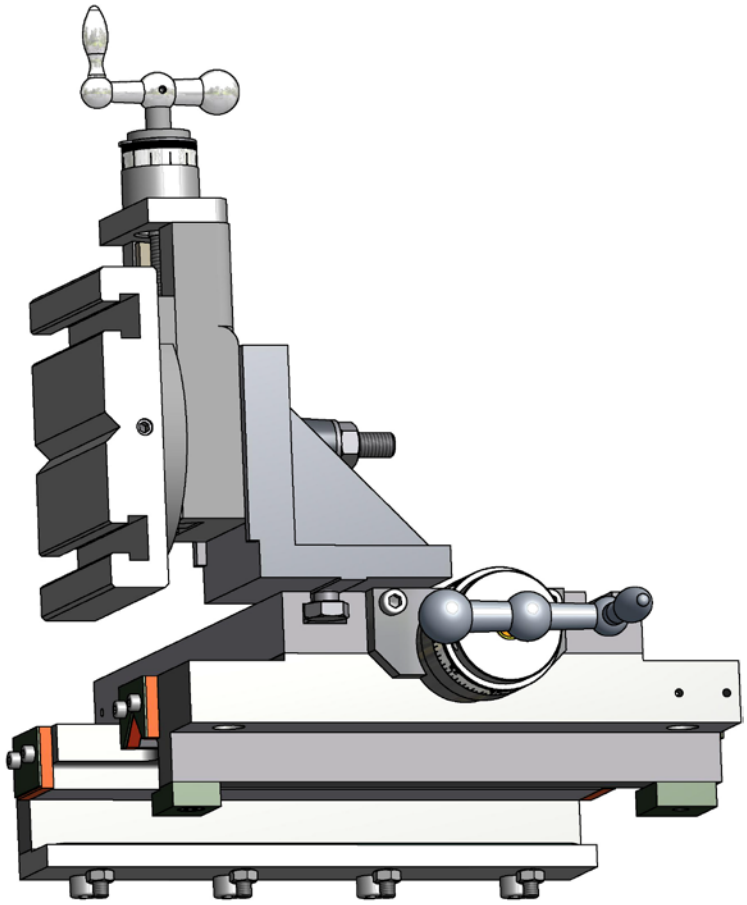
23. Tensioning bracket with milling machine table (optional)

For drilling and milling work

- For creating even surfaces and grooves
- The feed and return motions are carried out by the work piece.
- A machine vice may also be fitted to the milling machine table (6).
- The tool must be clamped as short as possible in the collect (risk of breakage).
- The width of the T-groove is 12 mm, the gap between the two T-grooves is 90 mm.
- The prismatic groove in the middle of the milling machine table is used to secure round parts.

23.1 Mounting the tensioning bracket with milling machine table to the lathe

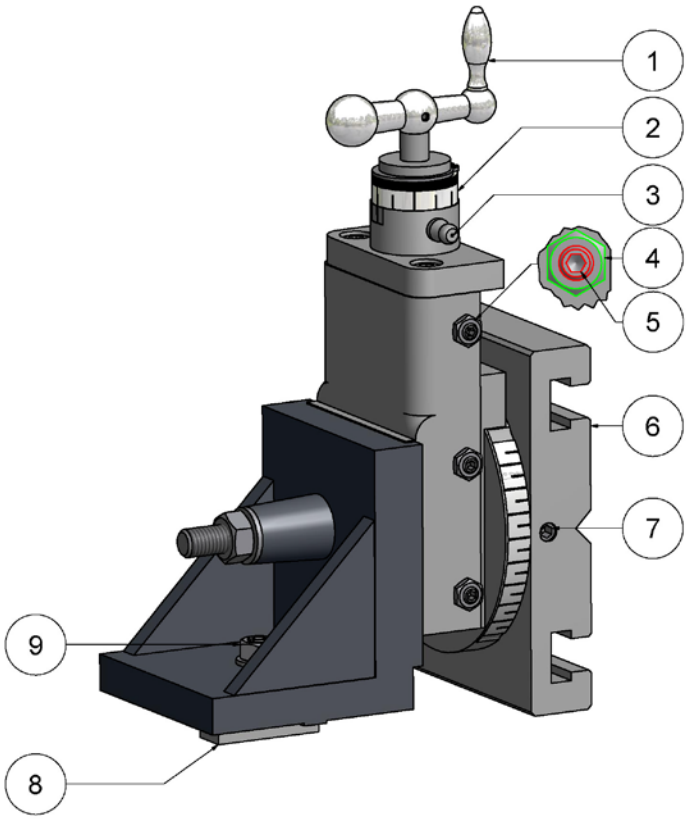
1. Remove the longitudinal skid from the transverse skid of the lathe
2. Clean the surface of the transverse skid of dirt and shavings. This is the only way to ensure a flat and safe surface.
3. Place the tensioning bracket as shown laterally onto the transverse skid. In doing so, insert the screw head on the underside of the tensioning bracket as shown into the T-groove of the transverse skid.
4. Slide the tensioning bracket with milling machine table to the required position on the transverse skid and secure the tensioning bracket.



23. Tensioning bracket with milling machine table (optional)

23.2. Operating elements

1. Crank for adjustment of the milling machine table in the y axis
2. Scale ring for reading off the travel distance of the y axis
3. Lubrication nipple for greasing the spindle bearing
4. Counter nut for securing the threaded pins (5)
5. Threaded pins for setting the guide play
6. Milling machine table for tensioning work pieces or vices
7. Screws for clamping the milling machine table
8. Screw for connecting the tensioning bracket with the transverse skid
9. Nut for securing the tensioning bracket to the transverse skid



23.3 Feed motion of the milling machine table

- Use the crank (1) to move the milling machine table in the y axis (vertical).
- Use the scale ring (2) to read off the distance of travel.
- One interval on the scale represents a distance of 0.05 mm. One full turn of the hand wheel is the same as a skid distance of 1 mm
- The distance of travel of the milling machine table in the x axis (horizontal) is carried out by adjusting the transverse skid.

23. Tensioning bracket with milling machine table (optional)

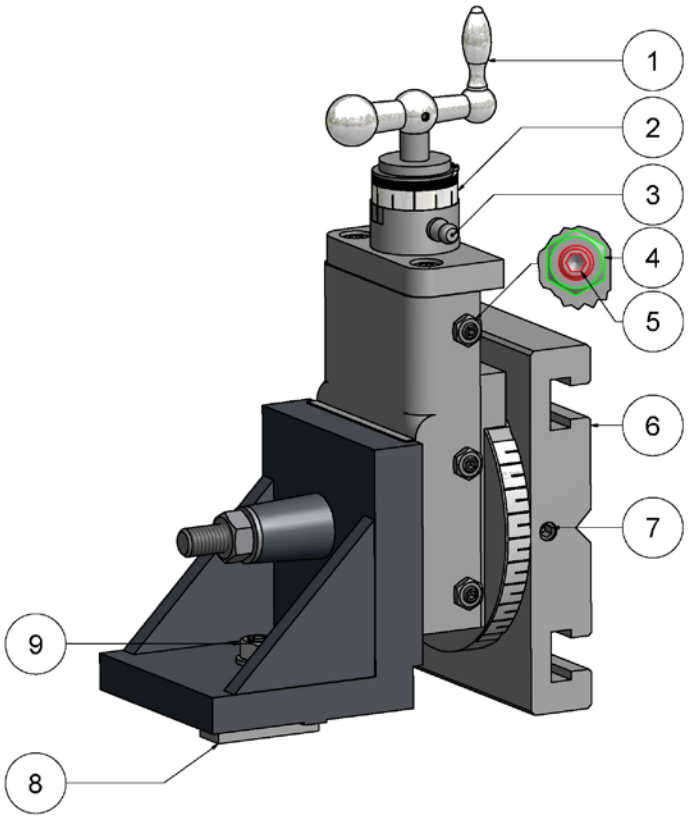
23.4 Adjustment of the dovetail guide

1. Undo the lock nuts (4)
2. Set the adjustment bar using the threaded pins (5) in such a way that the skid is free of play and can be moved with little force. To do this, the skid should be moved during the setting process and checked for play and appropriate ease of movement.
3. When the threaded pins (5) are set correctly, tighten the lock nuts (4) back up again

Only set the threaded pins (5) if they are in the range of the counter guide! To do this, the skid may need to be moved into this area. Otherwise the dovetail guide may jam and this may cause damages.

23.5 Alignment of the milling machine table

If the milling machine table has been moved unintentionally (angle of T-groove to x axis), this must first be realigned. To do this, open both screws (7) align the table and then tighten both screws up again (7). For the alignment work, always use a dial gauge if you have one.

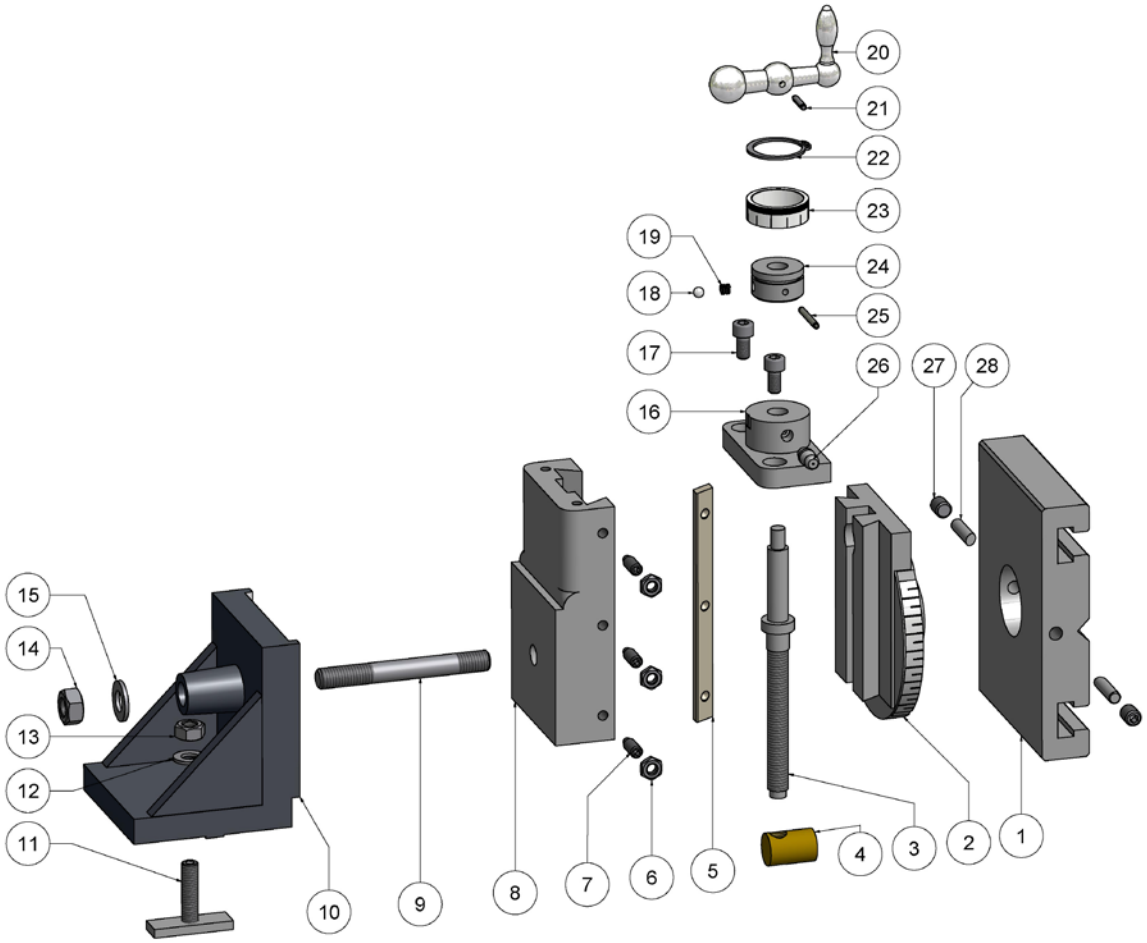


23.6 Lubrication of the tensioning bracket with milling machine table

- Use a class 2NLGI multi-purpose grease for lubrication
- Use lubricating oil with a viscosity of 100mm²/s for lubrication
- Prior to each use: Lubricate the spindle bearing at the lubrication nipple (3) using a grease press
  Grease the feed spindle accessible from the front
  Oil the dovetail guide with lubrication oil using an oil can

23. Tensioning bracket with milling machine table (optional)

23.7 Drawing and legend



23. Tensioning bracket with milling machine table (optional)

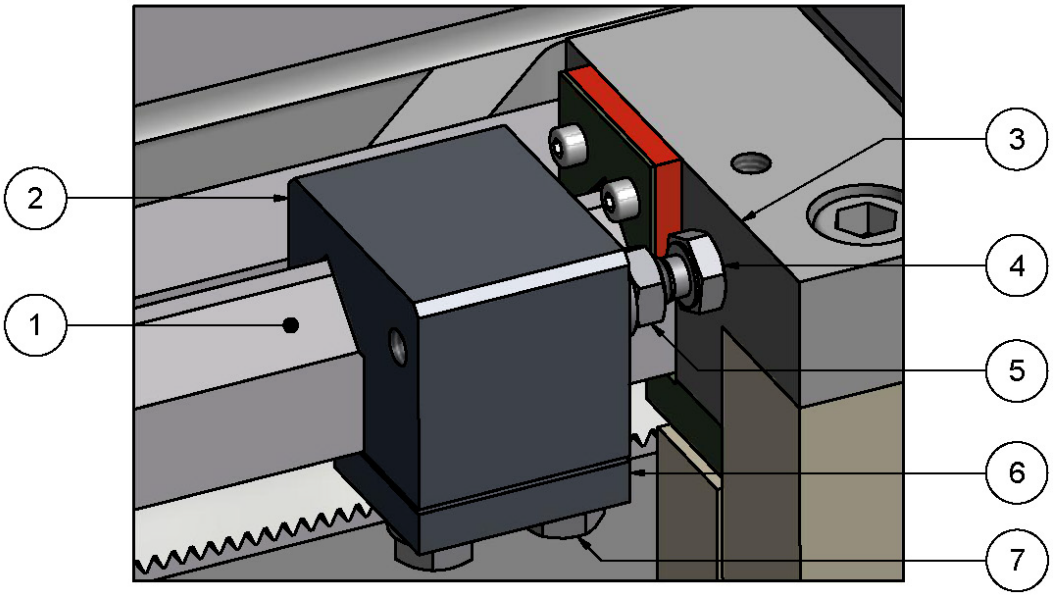
23.7 Drawing and legend

Part No.	Items	Order No.	Description
1	1	51003790-0001	Milling machine table
2	1	51400242-00011	Longitudinal support, under section
3	1	51004016-0004	Spindle
4	1	51007016-0002	Bronze nut
5	5	51001016-0006	Adjustment bar
6	3	16143900006000	Nut
7	3	16091500006016	Threaded pin
8	1	51003000-0001	Longitudinal support, upper section
9	1	16093800010070	Pin screw
10	1	51006831-00332	Tensioning bracket
11	1	51001016-00081	Screw
12	1	16112500008001	Washer
13	1	16193400008000	Nut
14	1	16193400010000	Nut
15	1	16112500010000	Washer
16	1	51003003-0001	Spindle bearing
17	2	16191200006012	Screw
18	1	51502131	Ball
19	1	51502009	Pressure spring
20	1	51507023-0001	Ball crank
21	1	16073430003014	Spiral tensioning pin
22	1	16147100025000	Securing ring
23	1	51006731-00021	Scale ring
24	1	51004025-0009	Adjusting ring
25	1	16073430003024	Spiral tensioning pin
26	1	51502517	Lubrication nipple
27	2	16091300008010	Threaded pin
28	2	51004006-0002	Push piece

24. Adjustable longitudinal stopper (optional)

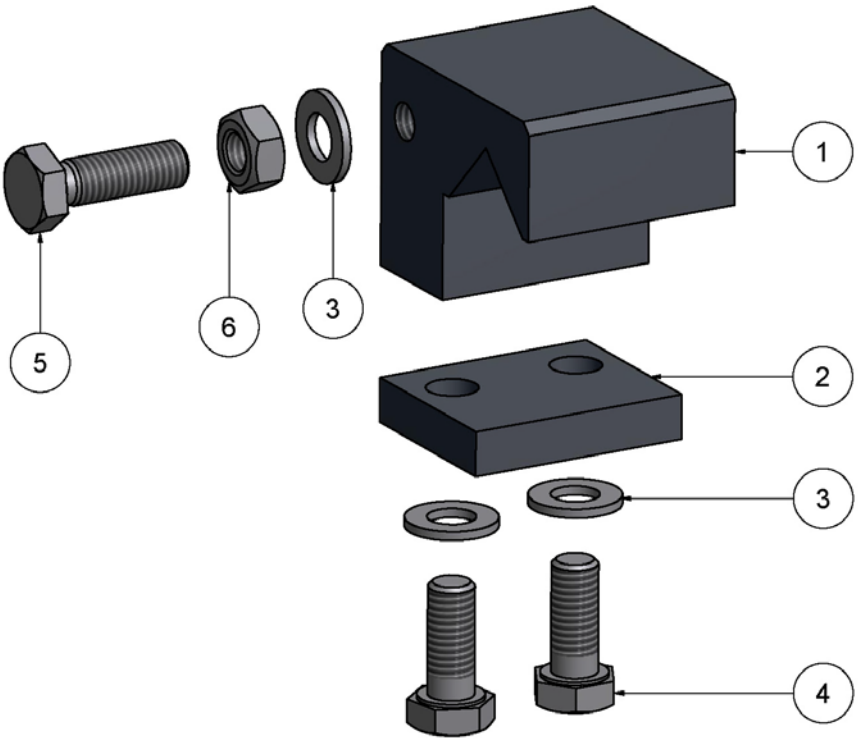
24.1 Mounting and operation of the adjustable longitudinal stopper

- Undo the two screws (7) and remove the clamping piece (6).
- Place the longitudinal stopper (2) on the front guide prism (2) of the lathe.
- Lightly screw the clamping piece (6) with the screws (7) into place as shown.
- The longitudinal stopper can now be pushed to the desired position.
- Tighten the screws (6) to secure the longitudinal stopper to the machine bed.
- Fine adjustment can be made using the screw (4) that acts as stopper for the transverse skid (3).
- To do this, release the counter nut (5) and turn the screw (4) in the desired direction.
- Then tighten the counter nut (5) back up again.



24. Adjustable longitudinal stopper (optional)

24.2 Drawing and legend



Part No.	Items	Order No.	Description
1	1	51004332-0001	Longitudinal stopper
2	1	51002041-0002	Clamping piece
3	3	16112500006001	Washer
4	2	16193300006016	Screw
5	1	16193300006025	Screw
6	1	16193400006000	Nut

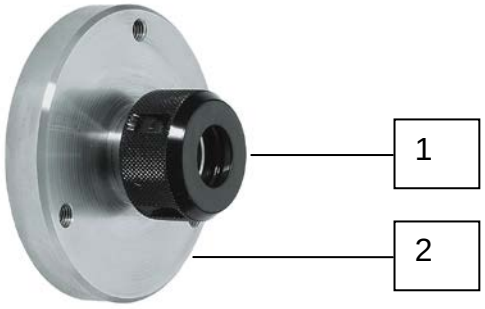
25. Collet chuck (optional)

Only use work pieces that correspond to the nominal diameter of the collet.

25.1 Mounting the collect chuck

1. Remove the lathe chuck from the main spindle. To do this, undo the 3 fixing screws using a wrench.
2. Remove the lathe chuck from the centring flange of the main spindle.
3. Secure the collet chuck in the same way as the lathe chuck.
4. Remove the cap nut (1) from the collet chuck (2).
5. Insert the required collect into the cap nut
   (see installing and removing collets) and screw back onto the collet chuck.
6. Insert the work piece or tool into the collet.
7. Tighten the cap nut with the appropriate wrench.
8. Permitted **revolution range up to a maximum of 5000 rpm**.

25.2 Drawing and legend



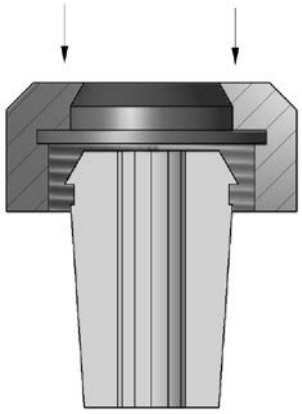
Part No.	Items	Order No.	Description
1	1	11727	Cap nut
2	1	51003505-0002	Collet chuck

25. Collet chuck (optional)

25.3. Installation and removal of collets

Installation

1. Place the collet on a flat surface.
2. Place the tensioning nut on the collet
3. Press the tensioning nut down against the collet until it "clicks".
4. The collet can now move freely in the central take-up shoulder and does not fall out when the collet is turned upside down.



Removal

1. Hold the tensioning nut in one hand
2. Press up against the collet.
3. The lateral pressure on the collet pushes this out of the take-up shoulder of the tensioning nut and it can now be removed from the nut.